



ProLiant DL580 Server
Maintenance and Service Guide

Third Edition (March 2001)
Part Number 152301-003
Spare Part Number 178139-001
Compaq Computer Corporation

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About This Guide

This maintenance and service guide is designed to be used as a reference, spare parts catalog, troubleshooting, and step-by-step disassembly guide when servicing the Compaq *ProLiant*[™] DL580 server.



WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs could create conditions that are hazardous.

IMPORTANT: The installation of options and servicing of this product shall be performed by individuals who are knowledgeable of the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.



WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.



CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Compaq Technician Notes



WARNING: Only authorized technicians trained by Compaq should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.



WARNING: To reduce the risk of electric shock or damage to the equipment:

- If the system has multiple power supplies, disconnect power from the system by unplugging all power cords from the power supplies.
 - Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
 - Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
-



CAUTION: To properly ventilate your system, you must provide at least 30.5 cm (12 inch) of clearance at the front and back of the computer.



CAUTION: The computer is designed to be electrically grounded (earthed). To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

IMPORTANT: Any indications of component replacement or printed wiring board modifications may void any warranty.

Rack Stability



WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
 - The full weight of the rack rests on the leveling jacks.
 - The stabilizing feet are attached to the rack if it is a single-rack installation.
 - The racks are coupled together in multiple-rack installations.
 - Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.
-

Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations:

Compaq Technical Support

In North America, call the Compaq Technical Phone Support Center at 1-800-OK-COMPAQ. This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.

Outside North America, call the nearest Compaq Technical Support Phone Center. Telephone numbers for worldwide Technical Support Centers are listed on the Compaq website. Access the Compaq website by logging on to the Internet:

<http://www.compaq.com>

Be sure to have the following information available before you call Compaq:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

Compaq Website

The Compaq website has information on this product as well as the latest drivers and Flash ROM images. Access the Compaq website by logging on to the Internet:

<http://www.compaq.com>

Compaq Authorized Reseller

For the name of your nearest Compaq authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.

Elsewhere, refer to the Compaq website for locations and telephone numbers.

Chapter **1**

Illustrated Parts Catalog

This chapter provides the illustrated parts breakdown and a spare parts list for the Compaq *ProLiant*[™] DL580 server. See Table 1-1 and Table 1-2 for the names of referenced spare parts.

Mechanical Parts Exploded View

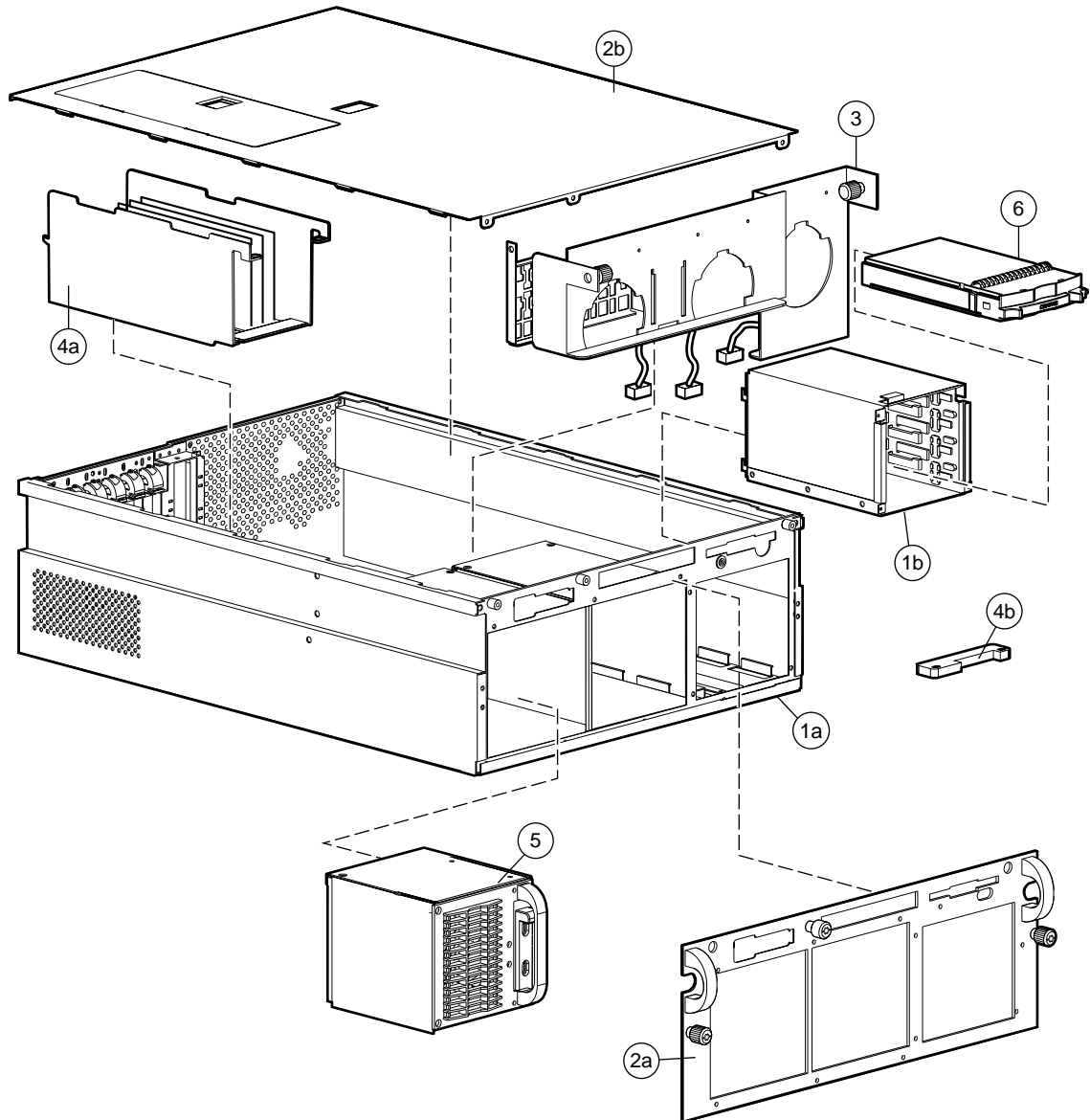


Figure 1-1. Exploded view of the ProLiant DL580 server mechanical parts

Mechanical Spare Parts List

Table 1-1
Mechanical Spare Parts List

| Item | Description | Spare Part Number |
|----------------------|---|--------------------------|
| Chassis | | |
| 1 | Chassis kit a) Chassis b) Wide ultra2/Ultra3 hard drive cage | 177899-001 |
| 2 | Cover kit a) Front bezel b) Top access panel | 177900-001 |
| Miscellaneous | | |
| 3 | Center wall and PCI guide bracket | 191444-001 |
| 4 | Plastics kit a) PCI Hot Plug basket insulator b) CD-ROM stop c) Peripheral board card guide * d) PCI card guide retainer * e) Filter cover * f) Memory board guide * g) Optional hot-plug expansion board retainer * h) Optional expansion board retainer * | 187681-001 |
| 5 | Power supply blank cover | 122641-001 |
| 6 | Hard drive blank cover | 122759-001 |
| * Not shown | | |

System Components Exploded View

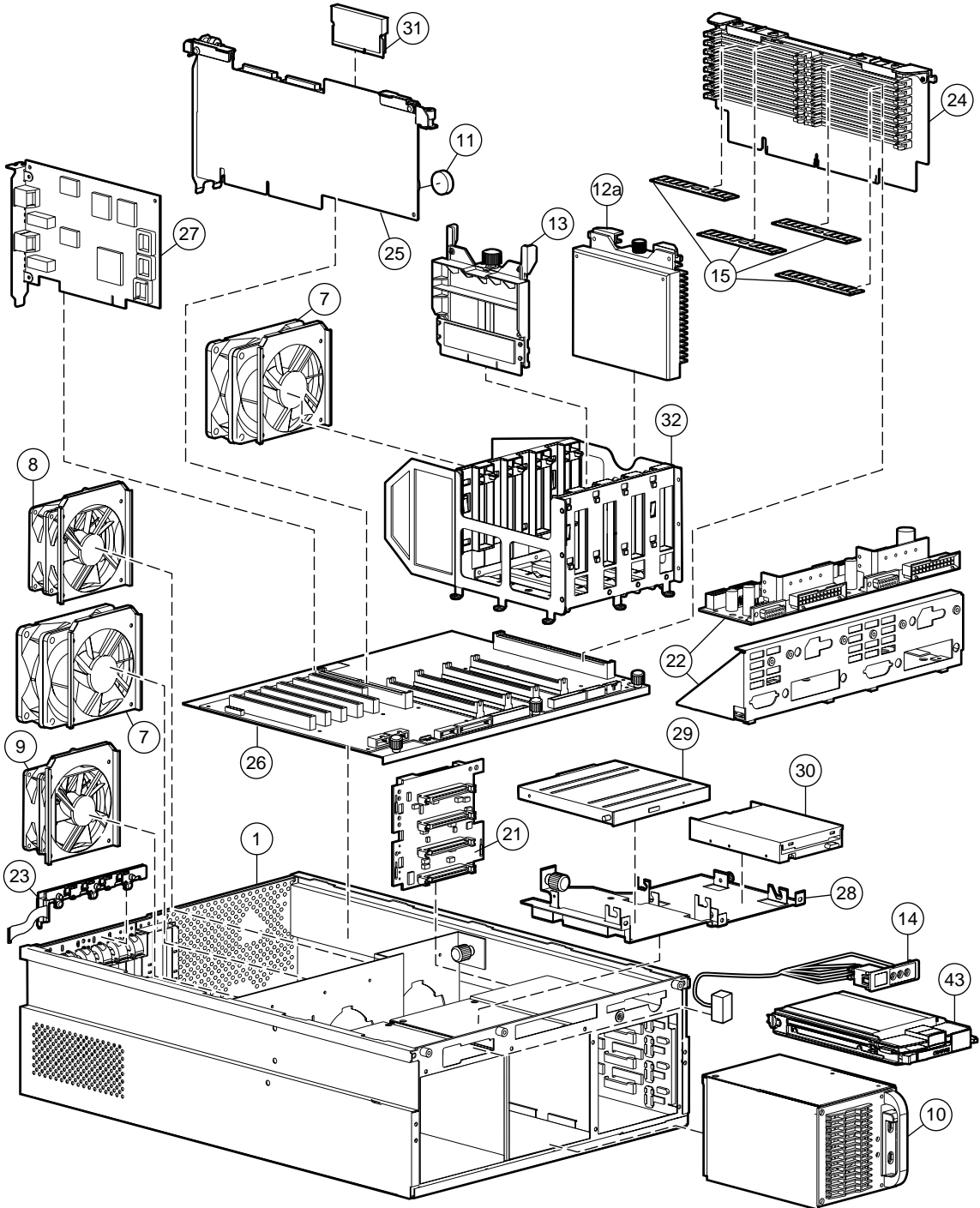


Figure 1-2. Exploded view of the ProLiant DL580 server system components

System Components Spare Parts List

Table 1-2
System Components Spare Parts List

| Item | Description | Spare Part Number |
|--------------------------|---|--------------------------|
| Fans | | |
| 7 | Hot-plug fan assemblies (2), 92 x 38.1 mm (3.62 x 1 ½ inch) | 177902-001 |
| 8 | Hot-plug fan assembly, 92 x 25.4 mm (3.62 x 1 inch) | 177903-001 |
| 9 | Hot-plug fan assembly, 80 x 20 mm (3.15 x 0.79 inch) | 177901-001 |
| System Components | | |
| 10 | Power supply, 450 watts, hot-plug | 101920-001 |
| 11 | Replacement battery, peripheral board | 179322-001 |
| 12 | Processors | |
| | a) 700-MHz (1-MB) processor with green heatsink | 175292-001 |
| | b) 700-MHz (2-MB) processor with green heatsink * | 175293-001 |
| | c) 900-MHz (2-MB) processor with green heatsink * | 188594-001 |
| 13 | Processor terminator module | 329271-001 |
| 14 | Power On/Standby Switch with LED indicators | 170321-001 |
| Memory | | |
| 15 | 128-MB DIMM (100-MHz SDRAM, 64-Megabit, CL-2) | 146488-001 |
| 16 | 256-MB DIMM (100-MHz SDRAM, 128-Megabit, CL-2) * | 146489-001 |
| 17 | 256-MB DIMM (100-MHz SDRAM, 64-Megabit, CL-2) * | 170514-001 |
| 18 | 512-MB DIMM (100-MHz SDRAM, 128-Megabit, CL-2) * | 146490-001 |
| 19 | 512-MB DIMM (100-MHz SDRAM, 256-Megabit, CL-2) * | 170515-001 |
| 20 | 1-GB DIMM (100-MHz SDRAM, 256-Megabit, CL-2) * | 170518-001 |

* Not shown

continued

Table 1-2
System Components Spare Parts List *continued*

| Item | Description | Spare Part Number |
|------------------------------|---|-------------------|
| Boards | | |
| 21 | SCSI hard drive backplane board | 387090-001 |
| 22 | Power backplane board (with subpan) | 161452-001 |
| 23 | PCI Hot Plug LED switchboard and cable | 168066-001 |
| 24 | Memory board, 16-DIMM | 168064-001 |
| 25 | Peripheral board | 101951-001 |
| 26 | System board with subpan | 175563-001 |
| 27 | NC3134 Fast Ethernet NIC 64 PCI Dual Base 10/100 Controller | 161105-001 |
| Media Storage Devices | | |
| 29 | CD-ROM Drive, 24X Low Profile | 323332-001 |
| 30 | Diskette drive | 158266-001 |
| Miscellaneous | | |
| 31 | Integrated Smart Array Controller (RAID) | 158855-002 |
| 32 | Processor cage | 189941-001 |
| 33 | Power cable kit * | 190016-001 |
| | a) Diskette/LVD power cable assembly | |
| | b) 10-position PS and MB power cable assembly | |
| | c) 12-position PS and MB power cable assembly | |
| | d) AC power cable assembly | |

* Not shown

continued

Table 1-2
System Components Spare Parts List *continued*

| Item | Description | Spare Part Number |
|----------------|--|-------------------|
| 34 | Signal cable kit * | 187682-001 |
| | a) Fan cable assembly, left side (1- and 2-inch) | |
| | b) Fan cable assembly, right side, (3- and 4-inch) | |
| | c) Fan cable assembly, right side, (5- and 6-inch) | |
| | d) Fan cable assembly, rear (7- and 8-inch) | |
| | e) Diskette drive data cable assembly | |
| | f) Data cable assembly, PS and MB | |
| | g) Internal/External VHDCI cable assembly | |
| | h) CD-ROM drive signal/power shared cable assembly | |
| 35 | Cable clips * | 189939-001 |
| | a) Double cable clip (adhesive back) | |
| | b) Cable clip wire wrap (adhesive back) | |
| | c) Clip for flat ribbon cable | |
| | d) Cable clip retainer (adhesive back) | |
| | e) Cable clip retainer, 0.125-inch diameter | |
| | f) Cable clip retainer, 7/16-inch diameter | |
| | g) Cable clip, 1/2-inch (adhesive back) | |
| 36 | Return kit * | 161500-001 |
| 37 | Country kit (rack) * | 178931-001 |
| 38 | Rack mounting kit * | 134699-001 |
| 39 | Maintenance and service guide * | 178139-001 |
| Options | | |
| 40 | 9.1-GB hot-plug Wide-Ultra2 hard drive (7,200 rpm, 1-inch) * | 104665-001 |
| 41 | 9.1-GB hot-plug Wide-Ultra2 hard drive (10,000 rpm, 1-inch)* | 386536-001 |
| 42 | 9.1-GB hot-plug Wide-Ultra3 hard drive (10,000 rpm, 1-inch) * | 152188-001 |
| 43 | 18.2-GB hot-plug Wide-Ultra2 hard drive (7,200 rpm, 1-inch) * | 104663-001 |
| 44 | 18.2-GB hot-plug Wide-Ultra2 hard drive (10,000 rpm, 1-inch) | 143920-001 |
| 45 | 18.2-GB hot-plug Wide-Ultra3 hard drive (10,000 rpm, 1-inch) * | 152190-001 |
| 46 | 9.1-GB hot-plug Wide-Ultra3 hard drive (15,000 rpm, 1-inch)* | 189393-001 |
| 47 | 18.2-GB hot-plug Wide-Ultra3 hard drive (15,000 rpm, 1-inch)* | 189395-001 |
| 48 | 36.4-GB hot-plug Wide-Ultra3 hard drive (10,000 rpm, 1-inch)* | 177986-001 |
| * Not shown | | |

Removal and Replacement Procedures

This chapter provides subassembly/module-level removal and replacement procedures for the Compaq ProLiant DL580 server. After completing all necessary removal and replacement procedures, run the Diagnostics program to verify that all components operate properly.



WARNING: To reduce the risk of personal injury or damage to the equipment, observe all warnings and cautions throughout this chapter.



WARNING: To reduce the risk of personal injury or damage to the equipment, the installation of options other than hot-plug power devices should be performed only by individuals who are qualified in servicing computer equipment and trained to deal with products capable of producing hazardous energy levels.

To service the ProLiant DL580 server, the following tools are recommended:

- Torx T-15 screwdriver
- 4-mm flat-blade screwdriver
- Phillips screwdriver
- Wire cutters
- From the Compaq *SmartStart*[™] and Support Software CD:
 - Drive Array Advanced Diagnostics (DAAD) software
 - System Configuration Utility software
 - Diagnostics software

Electrostatic Discharge Information

A discharge of static electricity can damage static-sensitive devices or microcircuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage. To prevent electrostatic damage, observe the following precautions:

- Transport products in static-safe containers such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Cover workstations with approved static-dissipating material. Provide a wrist strap connected to the work surface and properly grounded (earthed) tools and equipment.
- Keep work area free of nonconductive materials such as ordinary plastic assembly aids and foam packing.
- Always be properly grounded (earthed) when touching a static-sensitive component or assembly.
- Avoid touching pins, leads, or circuitry.
- Always place drives with the Printed Circuit Board (PCB) side down.
- Use conductive field service tools.

Symbols on Equipment

These symbols may be located on equipment in areas where hazardous conditions may exist.



This symbol in conjunction with any of the following symbols indicates the presence of a potential hazard. The potential for injury exists if warnings are not observed. Consult your documentation for specific details.



This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.



This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure.



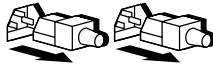
This symbol on an RJ-45 receptacle indicates a Network Interface Connection.

WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.



This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.



These symbols on power supplies or systems indicate the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.



Weight kg

Weight lb

This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

Preparation Procedures

The system power in the ProLiant DL580 server does not completely power down with the front panel Power On/Standby switch. The switch toggles between on and standby, rather than on and off. The standby position removes power from most electronics and the drives, but portions of the power supply and some internal circuitry remain active. To completely remove all power from the system, you must disconnect all power cords from the server. For more information about removing power from the system, see “Powering Down the Server” later in this chapter. See “Server Warnings and Precautions” later in this chapter for further safety information.

IMPORTANT: Before beginning to remove any serviceable part, determine whether the part is hot-pluggable or non-hot-pluggable. Hot-pluggable devices in the ProLiant DL580 server include SCSI hard drives, fans, and power supplies.

Hot-Pluggable Parts

If it is hot-pluggable, do not perform a power shutdown of the server. The access panel can be removed without causing system shutdown. Hot-pluggable devices in the ProLiant DL580 server include Wide Ultra2 and Ultra3 SCSI hard drives, some expansion boards, fans, and power supplies.

IMPORTANT: It is not necessary to power down the server to replace hot-plug devices such as power supplies, fans, or PCI Hot Plug boards when they are not in active use.

Non-Hot-Pluggable Parts

If the part is non-hot-pluggable, the server must be powered down. Non-hot-pluggable parts include the processors, some expansion boards, the peripheral board, DIMMs, and drive cages. See “Powering Down the Server” for complete powering down instructions.



WARNING: To reduce the risk of personal injury or damage to the equipment, the installation of options other than hot-plug power devices should be performed only by individuals who are qualified in servicing computer equipment and trained to deal with products capable of producing hazardous energy levels.



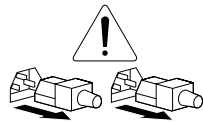
WARNING: To reduce the risk of personal injury or damage to the equipment when moving the server, be sure that:

- The access panel is securely fastened to the chassis.
 - You do not use the system board tray handle to move the unit.
 - You do not use the rack-mount bezel handles to move the unit.
-

Powering Down the Server

Before beginning any of the removal and replacement procedures for non-hot-plug devices:

1. Press the Power On/Standby switch. This switch places the server in standby mode that disables the main power supply output and provides only auxiliary power (+5V) to the server.
2. Verify that the Power On/Standby switch power LED indicator, is amber and that the fans are off.
3. Disconnect all AC power cords from the AC outlets, and then from the server.



WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.

4. Disconnect all external peripheral devices from the server.



56.24 - 70.31 kg
124 - 155 lb

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

NOTE: It is necessary to be knowledgeable of electrostatic discharge information before performing the preparation procedures. For electrostatic discharge information, see “Electrostatic Discharge Information” earlier in this chapter.

5. Position the server as follows to ensure stability and safety:
 - Remove the server from the rack and place the unit on a sturdy table or workbench.
 - To reduce the risk of personal injury or damage to the equipment, see “Server Warnings and Precautions” later in this chapter. Refer to the *Compaq ProLiant DL580 Server Setup and Installation Guide* for further information on working with racks.

Rack Warnings



WARNING: To reduce the risk of personal injury or damage to the equipment:

- Observe local occupational safety requirements and guidelines for heavy equipment handling.
- Obtain adequate assistance to lift and stabilize the product during installation or removal.
- Remove all pluggable power supplies and modules to reduce the weight of the product.
- Always load the heaviest item first, and load the rack from the bottom up. This makes the rack “bottom-heavy” and helps prevent the rack from becoming unstable.
- Extend the leveling jacks to the floor.
- Rest the full weight of the rack on the leveling jacks.
- Attach the stabilizing feet to the rack if it is a single-rack installation.
- Ensure the racks are coupled together in multiple-rack installations.
- Fully extend the bottom stabilizers on the equipment. Be sure that the equipment is properly supported/braced when installing options and boards.
- Be careful when sliding the unit into the rack. The slide rails could pinch your fingertips.
- Ensure that the rack is adequately stabilized before extending a component outside the rack. Extend only one component at a time. A rack may become unstable if more than one component is extended for any reason.
- Do not attempt to move a fully loaded equipment rack. Remove equipment from the rack before moving the rack.
- At least two people are needed to safely unload the rack from the pallet. An empty 42U rack weighs 115 kg (253 lb), is over 2.1 meters (7 ft) tall, and may become unstable when being moved on its casters. Do not stand in front of the rack as it rolls down the ramp from the pallet; handle it from the sides. Stabilize the server by keeping the unit on the rails.



WARNING: Because the rack allows stacking of computer components on a vertical rather than horizontal plane, ensure that precautions have been taken to provide for rack stability and safety. It is important to follow these precautions providing for rack stability and safety, and to protect both personnel and property. Heed all cautions and warnings throughout the installation instructions provided with the server.

Server Warnings and Precautions



WARNING: The installation of internal options and routine maintenance and service of this product should be performed by individuals who are knowledgeable about the procedures, precautions, and hazards associated with equipment containing hazardous energy levels.



WARNING: To reduce the risk of electric shock or damage to the equipment:

- Allow the product to cool before removing covers and touching internal components.
- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Disconnect power from the server by unplugging the power cord from either the electrical outlet or the server.
- Do not use conductive tools that could bridge live parts.
- Remove all watches, rings, or loose jewelry when working in hot-plug areas of an energized server.
- Understand the hot-plug access panel provides access to hazardous energy circuits.
- Understand the panel should remain locked during normal operation.

-Or-

Install the server in a controlled access location where only qualified personnel have access to the server.

- Power down the equipment and disconnect power to all AC power cords before removing any access covers for non-hot-pluggable areas.
 - Do not replace non-hot-pluggable components while power is applied to the product. First, shut down the product and disconnect all AC power cords.
 - Do not exceed the level of repair specified in the procedures in the product documentation. All troubleshooting and repair procedures are detailed to allow only subassembly or module-level repair. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.
 - Verify that the AC power supply branch circuit that provides power to the rack is not overloaded. Not overloading AC power to the rack power supply circuit reduces the risk of personal injury, fire, or damage to the equipment. The total rack load should not exceed 80 percent of the branch circuit rating. Consult the electrical authority having jurisdiction over your facility wiring and installation requirements.
-



CAUTION: Protect the server from power fluctuations and temporary interruptions with a regulating Uninterruptible Power Supply (UPS). This device protects the hardware from damage caused by power surges and voltage spikes, and keeps the system in operation during a power failure.



CAUTION: The ProLiant DL580 server must always be operated with the system unit cover on. Proper cooling is not achieved if the system unit cover is removed.

Top Access Panel

The ProLiant DL580 server ships standard in a rack-mount configuration. Remove the top access panel to service the internal components.



WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before removing them.

To remove the top access panel:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Using a Torx T-15 screwdriver, loosen the three captive screws securing the top access panel to the bezel.
3. Slide the top access panel back, then lift it from the chassis.

NOTE: The PCI Hot Plug access door allows access to the PCI Hot Plug area without removing the top access panel.

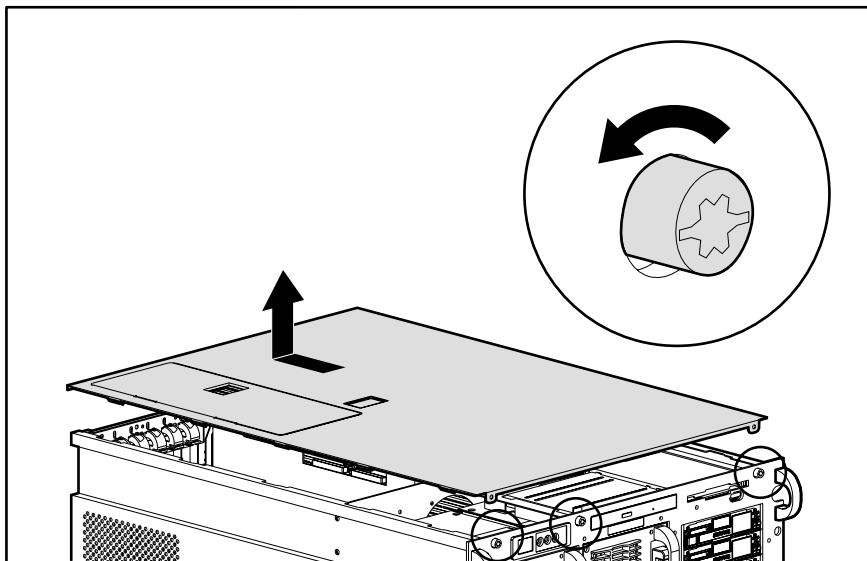


Figure 2-1. Removing the top access panel

Reverse steps 1 through 3 to replace the top access panel.

Power On/Standby Switch with LED Indicators

To remove the Power On/Standby switch with LED indicators:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the top access panel. See “Top Access Panel” earlier in this chapter.
3. Disconnect the power switch cables from the power switch connector.
4. Disconnect the clips connected to each of the LED indicator terminals.

IMPORTANT: Label each wire before disconnecting from LED indicator terminals.

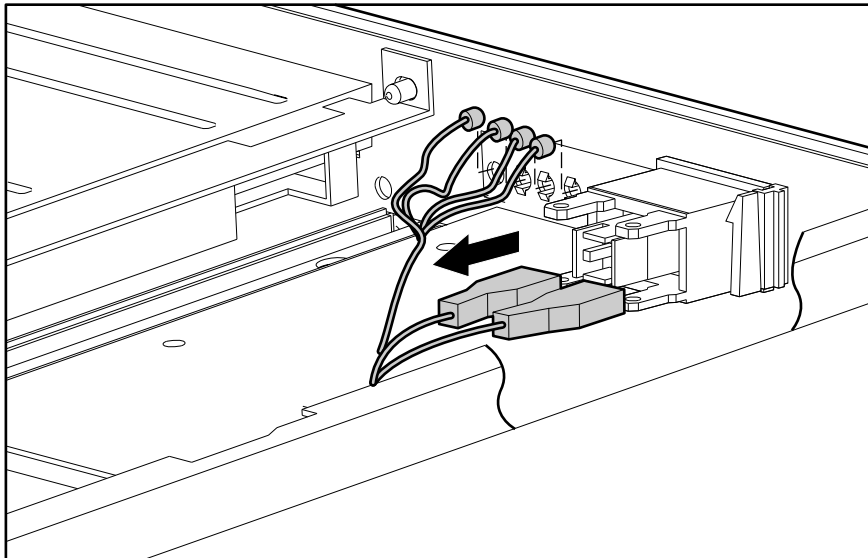


Figure 2-2. Disconnecting the Power On/Standby switch with LED indicators

5. Using a 4-mm flat-blade screwdriver, press in the tabs ❶ on each side of the switch, then pull the switch ❷ out from the front bezel.

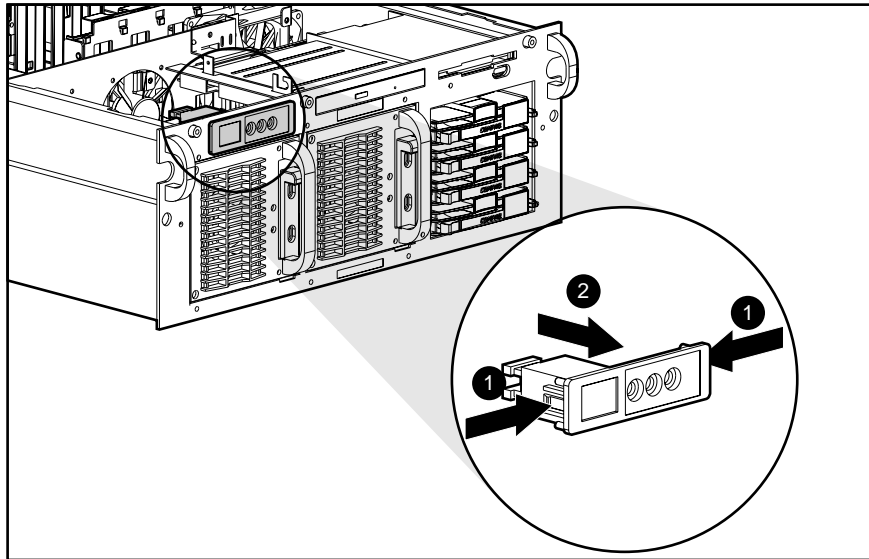


Figure 2-3. Removing the Power On/Standby switch with LED indicators

Reverse steps 1 through 5 to replace the Power On/Standby switch with LED indicators.

Front Bezel

To remove the front bezel:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the Power On/Standby switch. See “Power On/Standby Switch with LED Indicators” earlier in this chapter.
3. Remove the 14 Torx T-15 screws ❶.
4. Loosen the captive T-15 screw ❷, then pull the front bezel ❸ away from the server.

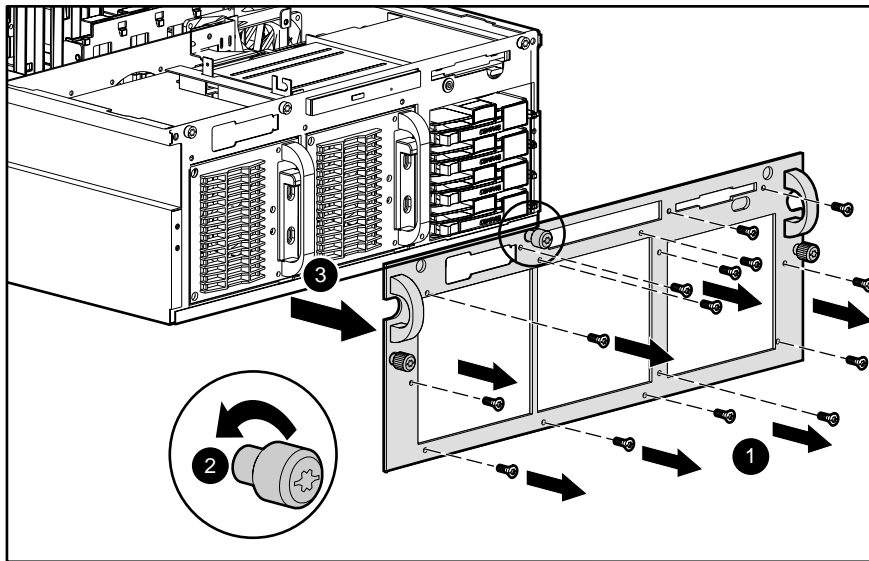


Figure 2-4. Removing the front bezel

Reverse steps 1 through 4 to replace the front bezel.

Hot-Plug Fan Assembly Identification

The ProLiant DL580 server ships standard with four hot-plug fan assemblies. Figure 2-5 shows the fan locations. All of the fans are redundant. Table 2-1 identifies each hot-plug fan and its relative location inside the ProLiant DL580 server.

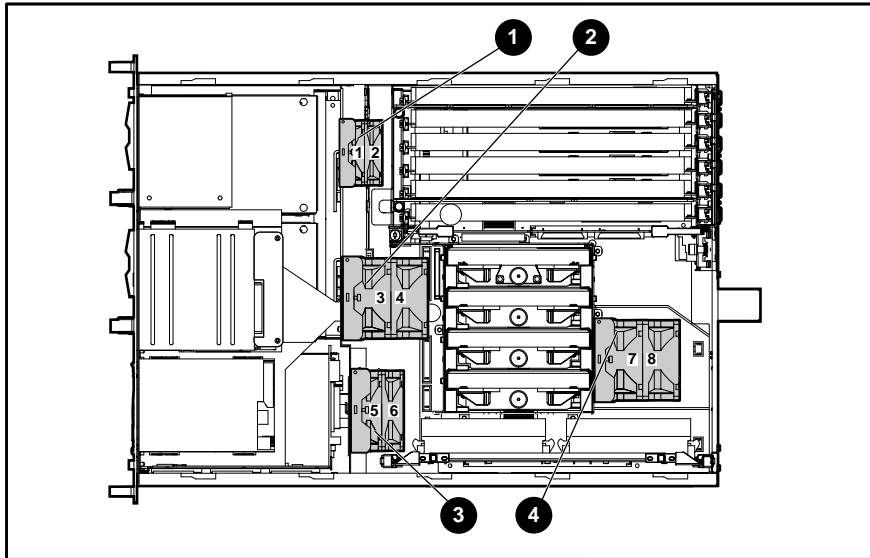


Figure 2-5. Hot-plug fan assembly locations

Table 2-1
Hot-Plug Fan Assembly Locations and Identification

| Item | Description |
|------|----------------------|
| ① | Fan assembly 1 and 2 |
| ② | Fan assembly 3 and 4 |
| ③ | Fan assembly 5 and 6 |
| ④ | Fan assembly 7 and 8 |

Hot-Plug Fan Assemblies



WARNING: To reduce the risk of personal injury or damage to the equipment:

- Failed or failing fans should be left connected to the system until they can be replaced.
- If a fan must be removed while the server is powered up, there is a 5-minute period allowed to remove and replace the fan before the server shuts down. (Microsoft Windows NT, UNIX, and Novell NetWare)
- Removal of both fans causes overheating and subsequent server shutdown.

NOTE: All hot-plug fan assemblies remove exactly the same way.

To remove a hot-plug fan assembly:

1. Remove the top access panel. See “Top Access Panel” earlier in this chapter.
2. Loosen the thumbscrew ❶ located at the top of the fan.
3. Lift the hot-plug fan ❷ straight out of the chassis.

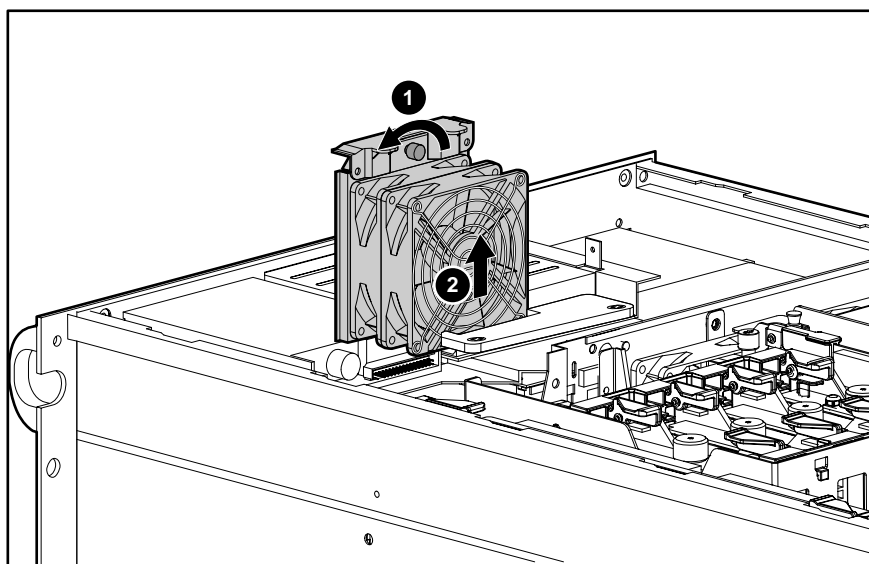


Figure 2-6. Removing a hot-plug fan assembly

Reverse steps 1 through 3 to replace a hot-plug fan.

Removable Media and Related Components

Removable media drives and hard drives are removed for replacement, upgrades, or when removing the SCSI hard drive backplane board.

Media Storage

The ProLiant DL580 server can utilize both Wide Ultra 2 and Wide Ultra 3 technology. The drive cage area can house up to four 1-inch, hot-plug hard drives.

IMPORTANT: Wide Ultra 2 or Wide Ultra 3 hard drives must use matching Wide Ultra 2 or Wide Ultra 3 array controllers.

Drives can be of any storage capacity, but must be mounted on Compaq hot-plug drive trays. Other standard devices include:

- Preinstalled 3.5-inch, 1.44-MB diskette drive
- Preinstalled 24X or higher low-profile CD-ROM drive

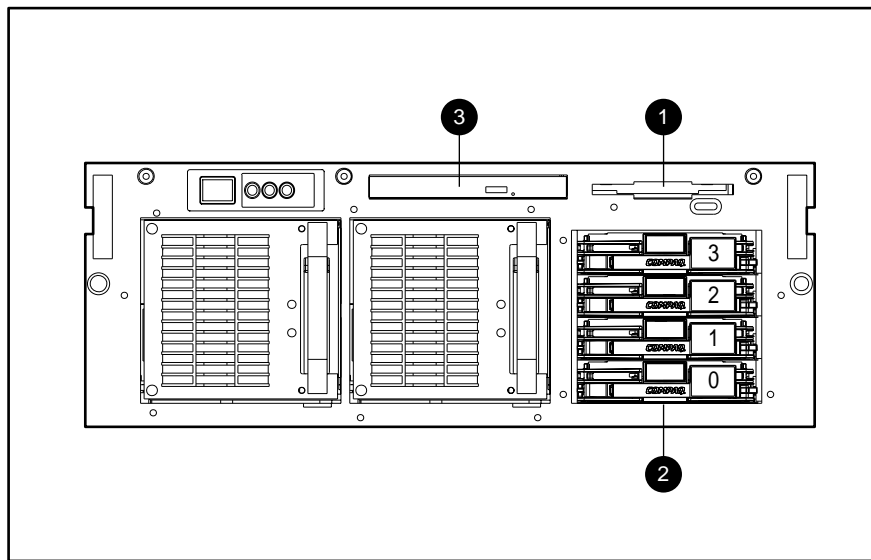


Figure 2-7. Removable media and hard drive locations

Table 2-2
Hard Drive Locations

| Item | Description |
|------|--|
| ① | 1.44-MB standard diskette drive |
| ② | Four 1-inch hard drives * |
| ③ | 24X or higher low-profile CD-ROM drive |

* SCSI drive IDs are shown

Hot-Plug Hard Drives

The following guidelines are noted when removing and replacing hot-plug hard drives:

- Never remove a hot-plug hard drive when the drive LED indicator is green. If several drives are used, the system boot drive is installed in the lowest numbered bay.
- Never remove more than one hard drive at a time. If the server is set in an array configuration, and a hard drive is replaced, the controller uses data from the other drives in the array to reconstruct data on the replacement drive. If more than one hard drive is removed, a complete data set is not available to reconstruct data on the replacement drive or drives.
- Never remove a working hard drive when another drive has been marked as failed by the controller. Permanent data loss occurs. Hard drives that have been failed by the controller are indicated by the amber drive failure LED indicator on the drive tray.
- Never remove a drive while another drive is being rebuilt. A drive online LED indicator flashes green when it is being rebuilt. A replaced drive is restored from data stored on the other drives.



CAUTION: Replace a hot-plug hard drive only when the drive LED indicator is amber. Do not remove a hot-plug hard drive if the online LED indicator is green.

To remove a hot-plug hard drive:

1. Press the sliding port-colored release tab ❶ to free the locking lever.
2. Open the locking lever ❷ to release the hard drive from the drive cage.
3. Pull the hard drive ❸ from the drive cage.

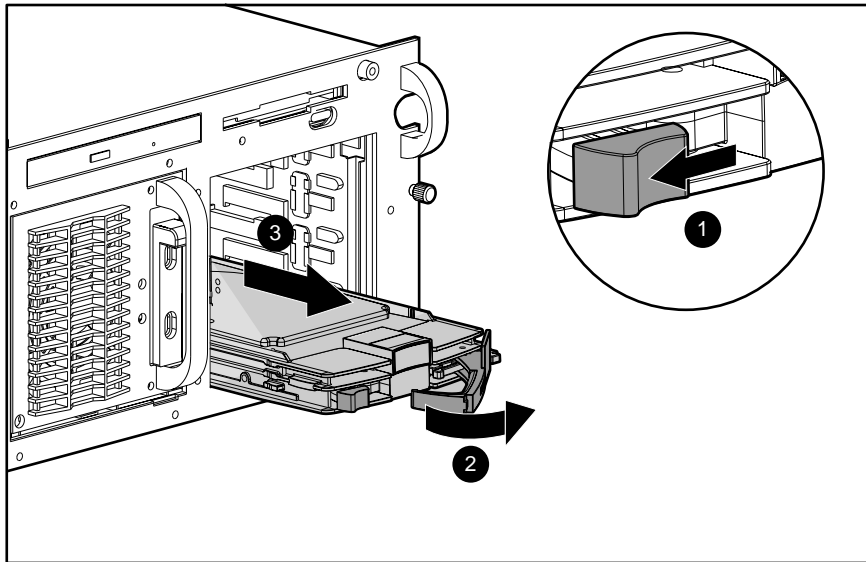


Figure 2-8. Removing a hot-plug hard drive

Reverse steps 1 through 3 to replace a hot-plug hard drive.

CD-ROM and Diskette Drive Removable Media Assembly

The CD-ROM and diskette drive removable media assembly holds two removable media devices, a 24X or higher low-profile CD-ROM drive and a 1.44-MB diskette drive.

To remove the CD-ROM and diskette drive removable media assembly:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the top access panel. See “Top Access Panel” earlier in this chapter.
3. Disconnect all cables from the CD-ROM and diskette drives. See “Cable Routing Diagrams” later in this chapter.
4. Loosen the captive thumbscrew ❶ securing the removable media assembly to the chassis.
5. Lift the removable media assembly ❷ from the server.

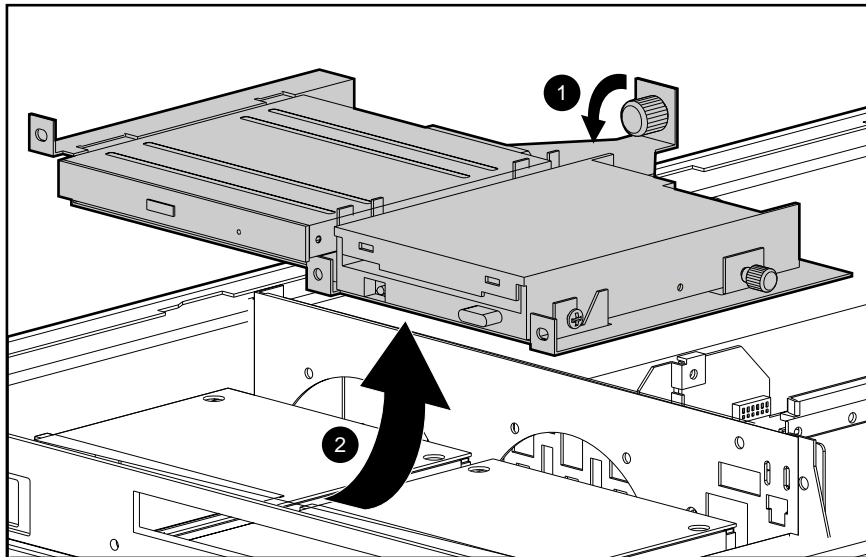


Figure 2-9. Removing the removable media assembly

Reverse steps 1 through 5 to replace the removable media assembly.

IMPORTANT: When the removable media assembly is removed, the diskette drive and the low-profile CD-ROM drive can be easily removed.

1.44-MB Diskette Drive

The ProLiant DL580 server ships with a standard 1.44-MB diskette drive secured to the removable media assembly.

To remove the 1.44-MB diskette drive:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Disconnect all cables from the diskette drive. See “Diskette Drive Signal and Power Cables” later in this chapter.
3. Lift out the removable media assembly. See “CD-ROM and Diskette Drive Removable Media Assembly” earlier in this chapter.
4. Loosen the captive T-15 screw ❶ that secures the drive to the removable media assembly.
5. Move the diskette drive ❷ back, then up from the removable media assembly.

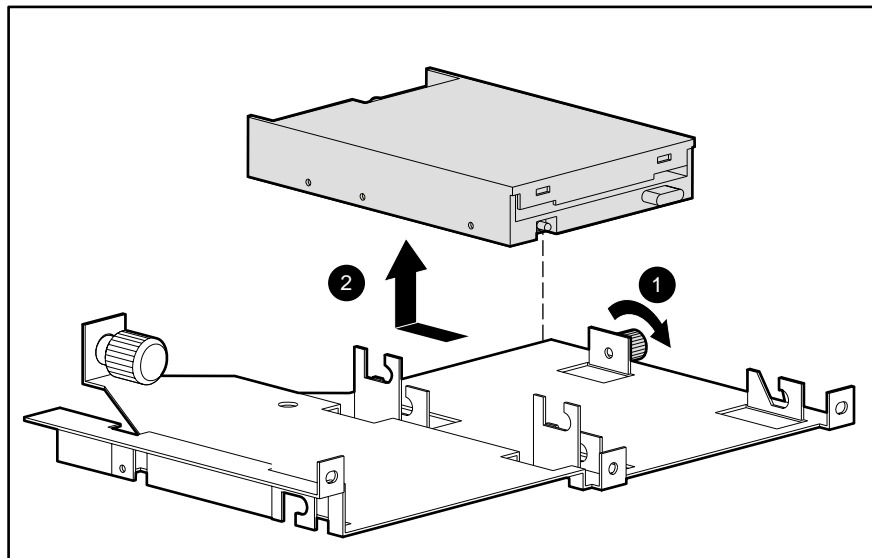


Figure 2-10. Removing the 1.44-MB diskette drive

Reverse steps 1 through 5 to replace the 1.44-MB diskette drive.

24X or Higher Low-Profile CD-ROM Drive

The ProLiant DL580 server ships with a 24X or higher low-profile CD-ROM drive. This drive may be removed with the removable media assembly still secured to the server, or by removing the removable media assembly.

To remove the 24X or higher low-profile CD-ROM drive:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the top access panel. See “Top Access Panel” earlier in this chapter.
3. Remove the cables from the rear of the drive. See “24X or Higher Low-Profile CD-ROM Signal and Power Cables” later in this chapter.
4. Lift out the removable media assembly. See “CD-ROM and Diskette Drive Removable Media Assembly” earlier in this chapter.
5. Loosen the two captive thumbscrews ❶ that secure the plastic stop to the CD-ROM and diskette drive removable media assembly, then lift the plastic stop ❷ away from the removable media assembly.
6. Move the CD-ROM ❸ back, then out of the CD-ROM and diskette drive removable media assembly.

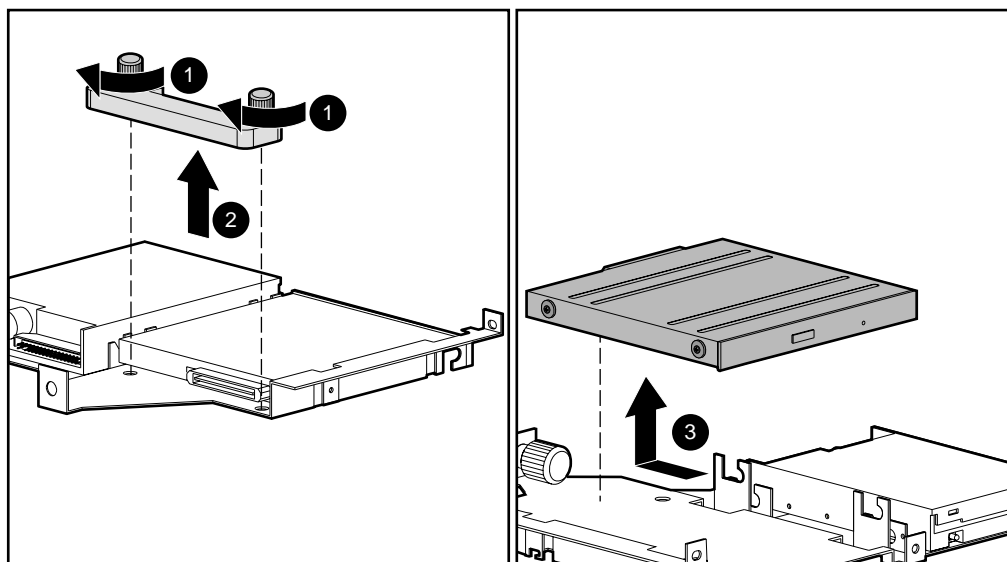


Figure 2-11. Removing the CD-ROM drive

Reverse steps 1 through 6 to replace the 24X or higher low-profile CD-ROM drive.

Cable Routing Diagrams



CAUTION: When routing cables, always ensure that the cables are not in a position in which they can be pinched or crimped.

24X or Higher Low-Profile CD-ROM Signal and Power Cables

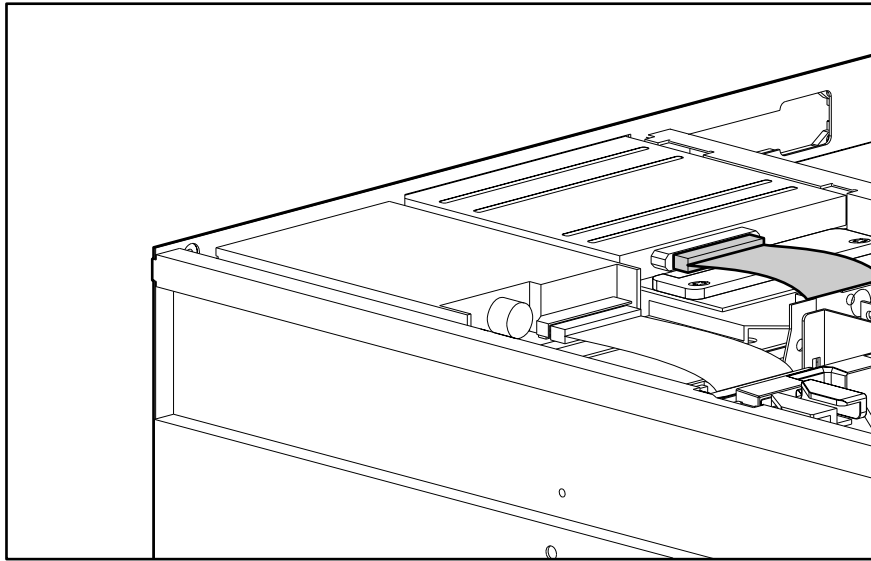


Figure 2-12. 24X or higher low-profile CD-ROM signal and power cable routing

Diskette Drive Signal and Power Cables

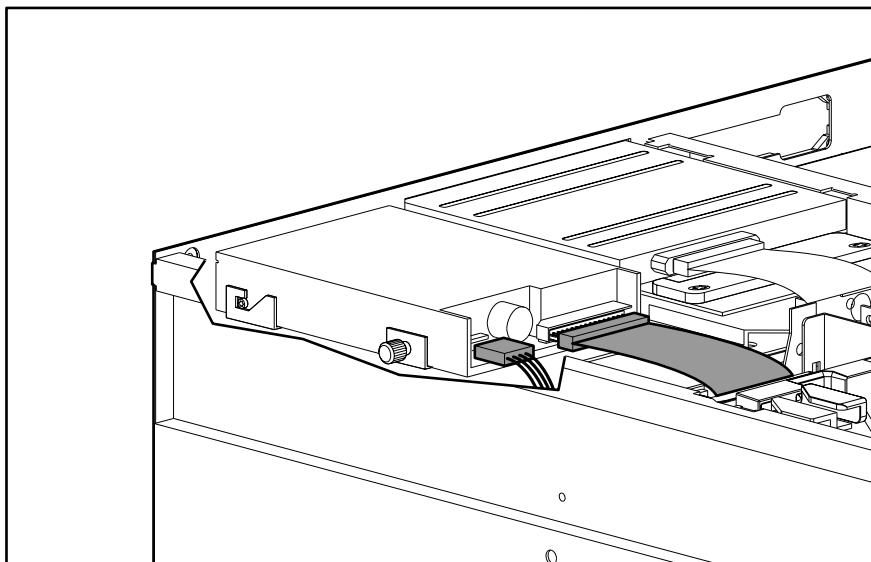


Figure 2-13. Diskette drive signal and power cable routing

Power Switch Cables

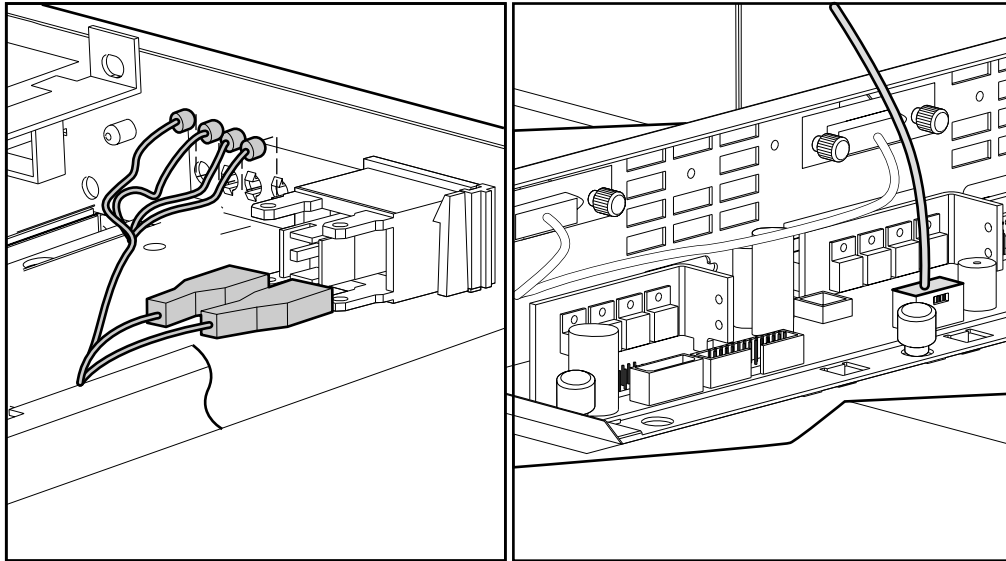


Figure 2-14. Power switch cable routing

Power Backplane Board Cables

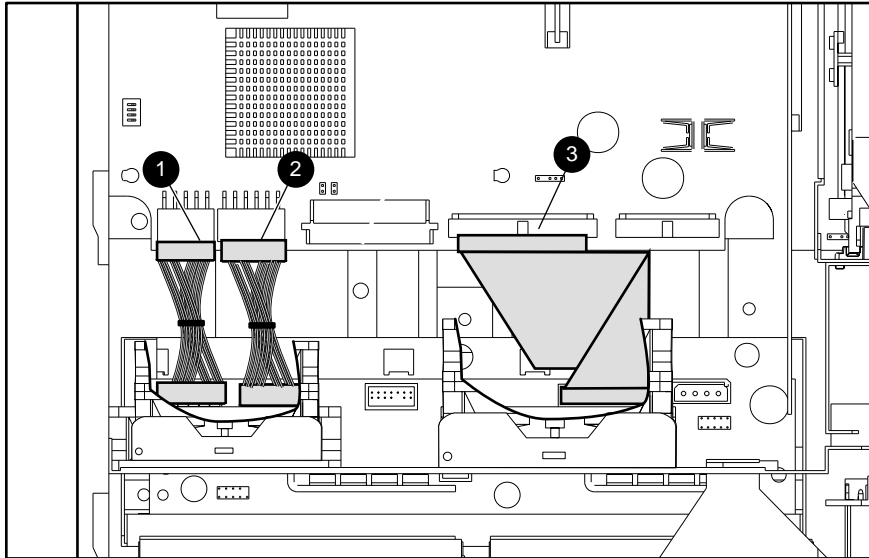


Figure 2-15. Power backplane board cable routing

Table 2-3
Power Backplane Board Cables

| Item | Description |
|------|---------------------------|
| ① | Power cable |
| ② | Power cable |
| ③ | Miscellaneous power cable |

Peripheral Board Data Cables

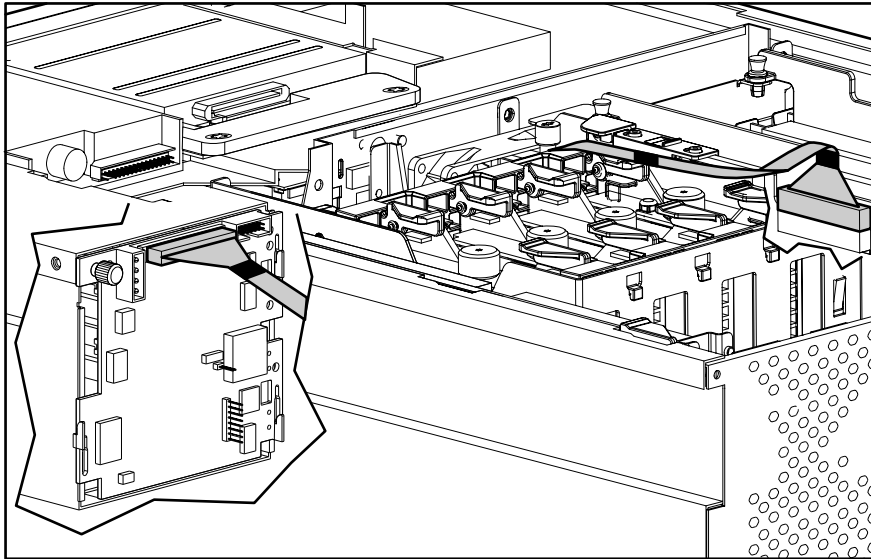


Figure 2-16. Peripheral board data cable routing

Hot-Plug Power Supply



CAUTION: If one of the power supplies is removed, immediately replace it with another power supply, or immediately insert a power supply blank cover to allow proper airflow. Do not operate for more than a few minutes without taking these precautions.

NOTE: It is not necessary to place the system in standby mode for a hot-plug power supply replacement in a power supply configuration.

To remove a hot-plug power supply:

1. Unplug the AC power cord from the hot-plug power supply.
2. Grasp the power supply handle **1**, then slide up the release lever.
3. Pull the power supply **2** from the server.

IMPORTANT: A power supply blank cover is removed exactly the same way. Ensure that the release lever is in the up position when the power supply blank cover is replaced, then lower the release lever when the blank cover is fully inserted.

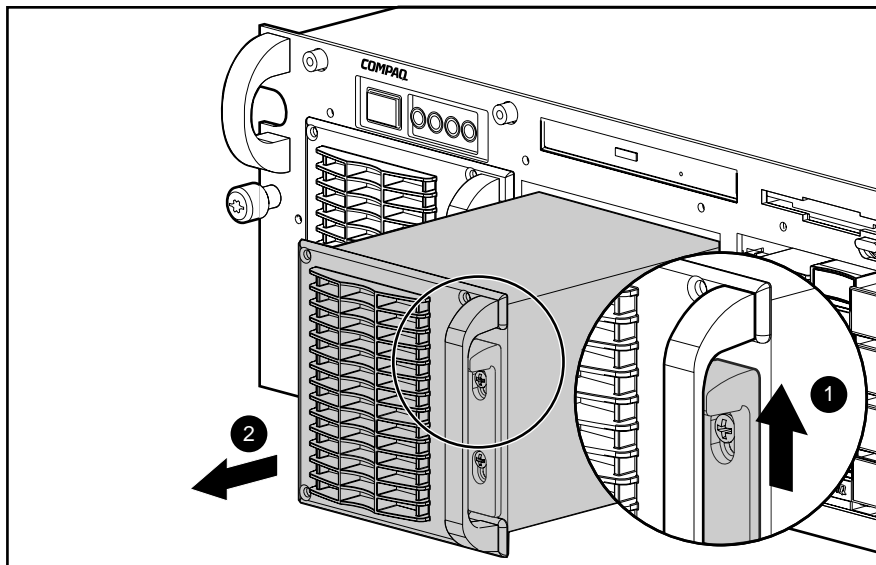


Figure 2-17. Removing a hot-plug power supply

Reverse steps 1 through 3 to replace a hot-plug power supply.

Processors and Processor Terminator Modules

The ProLiant DL580 server contains at least one processor and three processor terminator modules. The ProLiant DL580 server can support a maximum of four processors.

IMPORTANT: Each processor slot must be populated by a processor or a terminator module for proper bus termination.

Processor and Processor Terminator Module Locations

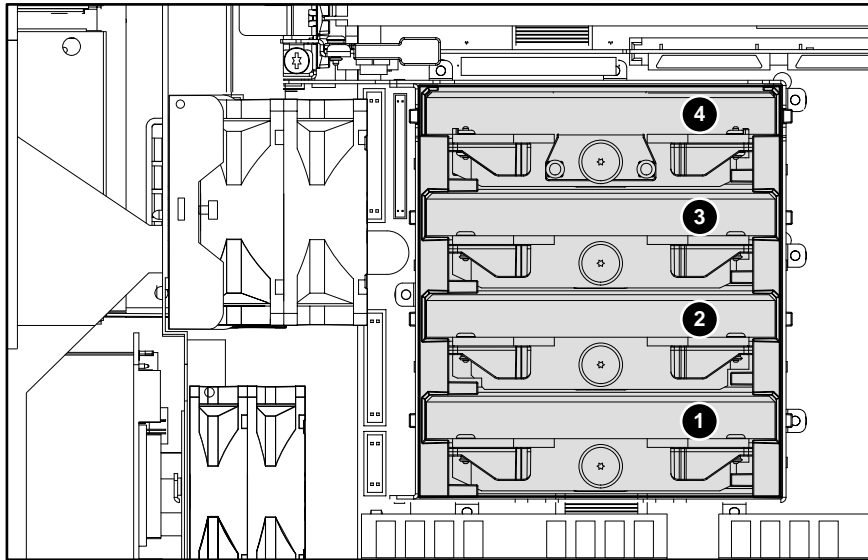


Figure 2-18. Processor and processor terminator module locations

Table 2-4
Processor and Processor Terminator Module Locations

| Item | Description |
|------|-----------------------------|
| ① | Processor 1 |
| ② | Processor 2 |
| ③ | Processor 3 |
| ④ | Processor terminator module |

Processor

To remove a processor:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the top access panel. See “Top Access Panel” earlier in this chapter.
3. Loosen the retention screw ❶.
4. Pull up both ejector levers ❷.
5. Lift the processor out of the processor slot ❸.

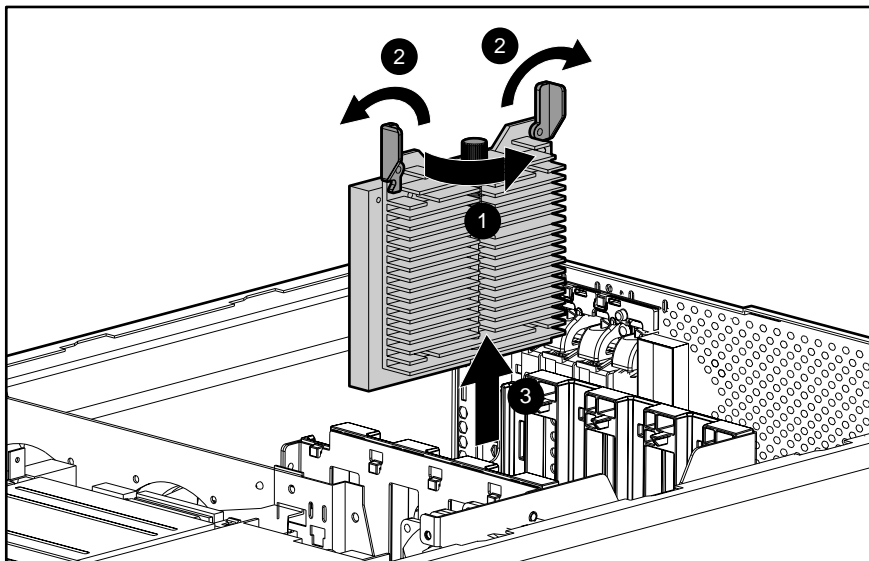


Figure 2-19. Removing a processor

Reverse steps 1 through 5 to replace a processor. The processor is keyed to ensure correct alignment.

IMPORTANT: When installing a server with Pentium III Xeon processors running at speeds of 550 MHz or greater in Compaq Rack 7000 series racks (part numbers 165753-001 [42U] and 163747-001 [22U]), the new processor technology requires the installation of a new Compaq High Airflow Rack Door Insert (part number 327281-B21 [single] or 327281-B22 [6-pack] for 42U racks, and 157847-B21 [single] or 157847-B22 [6-pack] for 22U racks).

NOTE: This notice applies to servers with Pentium III Xeon processors running at 550 MHz or greater that are installed in 7000 series racks. Compaq servers based on other processor technologies (including Pentium III Xeon processors) do not require any rack changes.

Processor Terminator Module

IMPORTANT: If a processor is removed, the processor terminator module must be reinstalled before powering up the server. Failure to have either a processor or processor terminator module installed results in an interlock fault condition that prevents the server from powering up.

To remove a processor terminator module:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the top access panel. See “Top Access Panel” earlier in this chapter.
3. Loosen the retention screw ❶.
4. Pull up the two ejector levers ❷ to release the processor terminator module from the connector slot.
5. Lift the processor terminator module ❸ out of the slot.

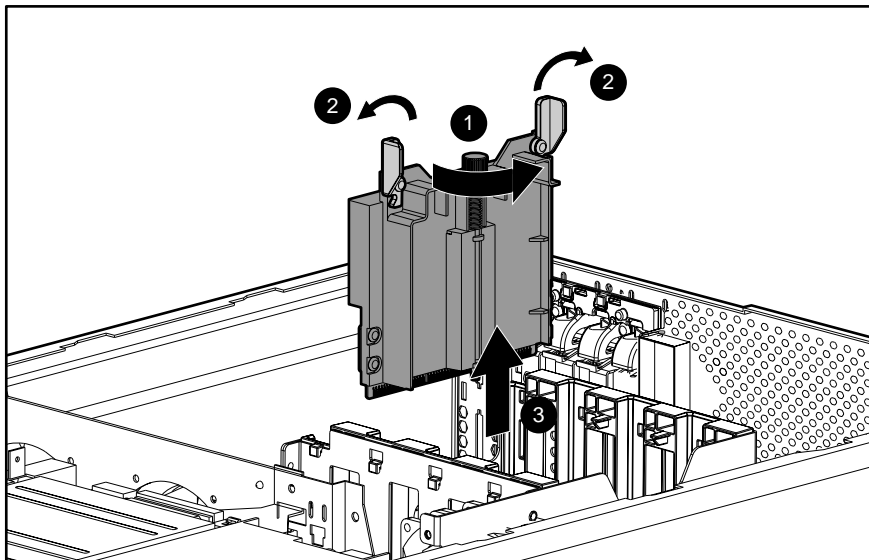


Figure 2-20. Removing a processor terminator module

Reverse steps 1 through 5 to replace a processor terminator module.

Peripheral Board



CAUTION: Disconnect all power cords from the power supplies to completely remove power from the system. Ensure to disconnect all power cords from the server before removing the peripheral board.

To remove the peripheral board:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the top access panel. See “Top Access Panel” earlier in this chapter.
3. Disconnect all cables from the peripheral board. See “Cable Routing Diagrams” earlier in this chapter.
4. Loosen the two thumbscrews ❶ that secure the peripheral board to the chassis.
5. Rotate the peripheral board handles ❷ outward.



CAUTION: Rotating the peripheral board handles a full 90 degrees causes the handles to break.

6. Lift the peripheral board ❸ up from the system board slot.

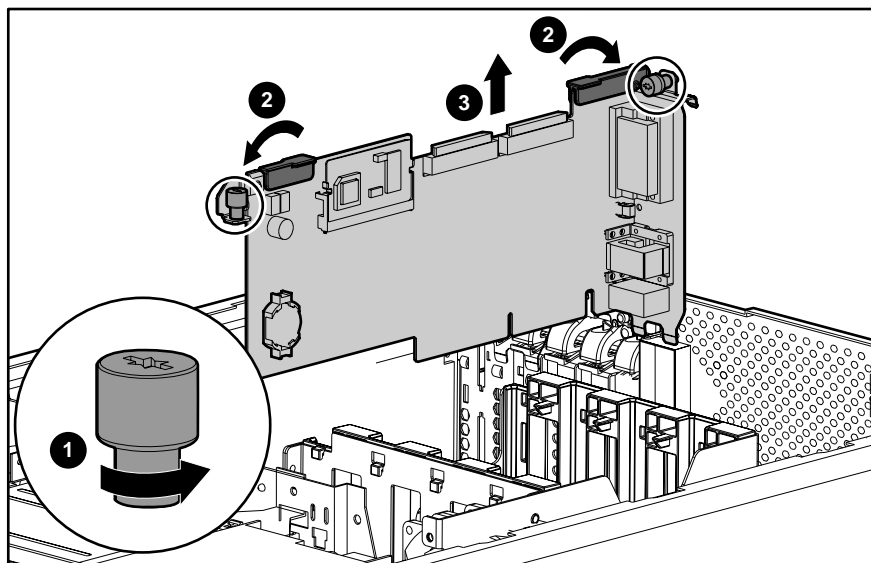


Figure 2-21. Removing the peripheral board

Reverse steps 1 through 6 to replace the peripheral board.

Memory

The following guidelines **must** be followed when installing or replacing memory:

- Use only Compaq supported 100-MHz SDRAM DIMMs.
- Install SDRAM DIMMs in the proper socket sequence.
- Install SDRAM DIMMs in sets of four starting from bank 1 through bank 4.
- Install SDRAM DIMMs in the following socket sequence to ensure optimum performance. See Figure 2-22 for SDRAM DIMM socket locations. Table 2-5 identifies the proper DIMM sequence. Table 2-6 provides various combinations of DIMMs on the memory board.

NOTE: This server does not support Fast Page DIMMs.

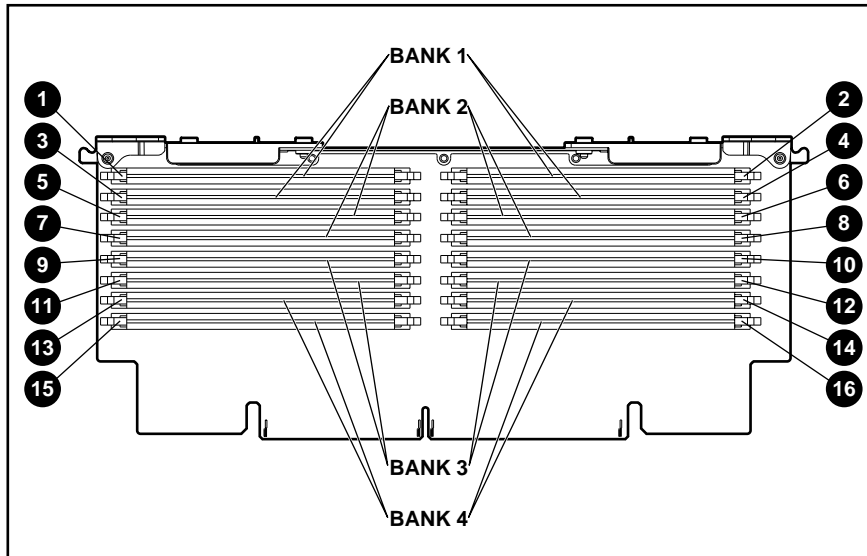


Figure 2-22. Memory banks and memory sockets on the memory board

Table 2-5
SDRAM DIMM Socket Locations

| Bank | DIMM Socket | DIMM Socket | DIMM Socket | DIMM Socket |
|------|-------------|-------------|-------------|-------------|
| 1 | 1 | 2 | 3 | 4 |
| 2 | 5 | 6 | 7 | 8 |
| 3 | 9 | 10 | 11 | 12 |
| 4 | 13 | 14 | 15 | 16 |

Dual Inline Memory Module Combinations

Table 2-6
Dual Inline Memory Module (DIMM) Combinations

| Total Memory | Socket 1 | Socket 2 | Socket 3 | Socket 4 | Socket 5 | Socket 6 | Socket 7 | Socket 8 |
|--------------|----------|----------|----------|----------|----------|----------|----------|----------|
| 512 MB | 128 MB | 128 MB | 128 MB | 128 MB | | | | |
| 1 GB | 128 MB | 128 MB | 128 MB | 128 MB | 128 MB | 128 MB | 128 MB | 128 MB |
| 1 GB | 256 MB | 256 MB | 256 MB | 256 MB | | | | |
| 2 GB | 256 MB | 256 MB | 256 MB | 256 MB | 256 MB | 256 MB | 256 MB | 256 MB |
| 4 GB | 512 MB | 512 MB | 512 MB | 512 MB | 512 MB | 512 MB | 512 MB | 512 MB |
| 8 GB | 1 GB | 1 GB | 1 GB | 1 GB | 1 GB | 1 GB | 1 GB | 1 GB |

Note: These are examples only. Because the board has 16 sockets, more DIMM combinations can be added as long as the DIMMs are installed in sets of 4 modules per bank. DIMMs must be identical in each bank.

Memory Board

The memory board is removed for replacement, to access the system board, or to facilitate DIMM installations.

To remove the memory board:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the top access panel. See “Top Access Panel” earlier in this chapter.
3. Push both sides of the release locks ❶ in toward the center of the memory board to free the ejector levers.
4. Pull up the ejector levers ❷ on the sides of the memory board.
5. Lift the memory board ❸ from the chassis.

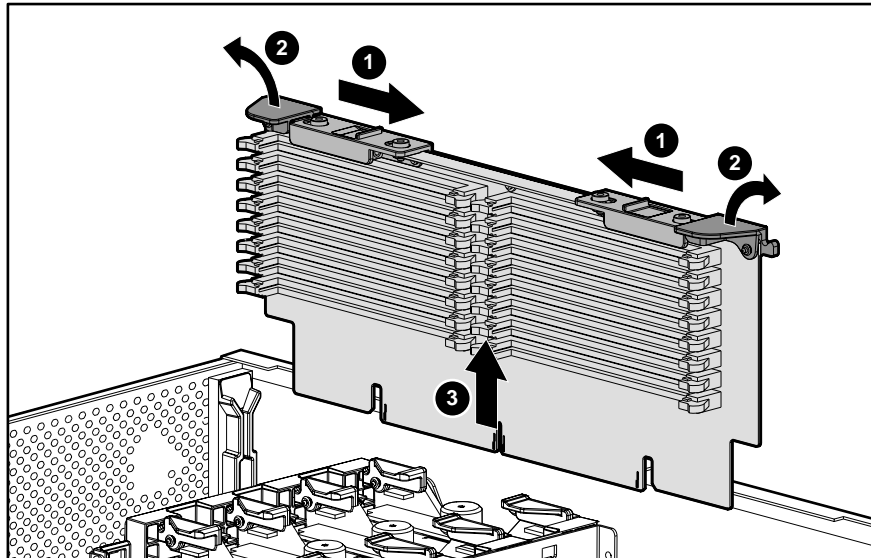


Figure 2-23. Removing the memory board

Reverse steps 1 through 5 to replace the memory board.

Dual Inline Memory Modules

To remove a DIMM:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the memory board. See “Memory Board” earlier in this chapter.
3. Pull out the ejector levers ❶ at each end of the memory module.
4. Lift the module ❷ from the memory board.

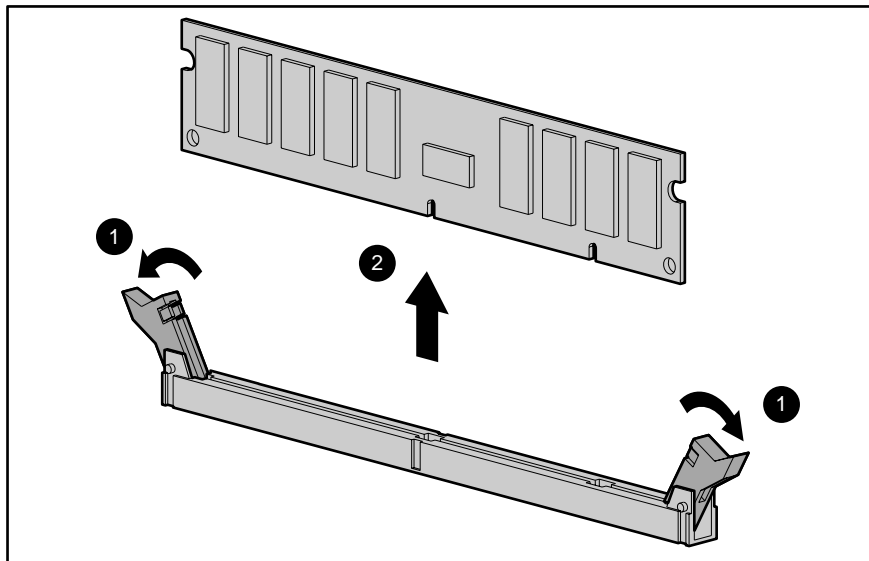


Figure 2-24. Removing a DIMM

Reverse steps 1 through 4 to replace a DIMM. Align the socket key on the bottom edge of each DIMM with the tab before seating the DIMM into the socket.

Center Wall

To remove the center wall:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the top access panel. See “Top Access Panel” earlier in this chapter.
3. Remove the CD-ROM and diskette drive removable media assembly. See “CD-ROM and Diskette Drive Removable Media Assembly” earlier in this chapter.
4. Remove the three fan assemblies secured to the center wall. See “Hot-Plug Fan Assembly Identification” and “Hot-Plug Fan Assemblies” earlier in this chapter.
5. Disconnect the center wall fan assembly power cables from the power backplane board.
6. Remove the peripheral board. See “Peripheral Board” earlier in this chapter.
7. Pull the center hot-plug power supply out of the chassis. See “Hot-Plug Power Supply” earlier in this chapter.
8. Remove the PCI guide bracket. See “PCI Guide Bracket” later in this chapter.
9. Loosen the two captive thumbscrews ❶ that secure the center wall to the chassis.
10. Lift the center wall ❷ up from the chassis.

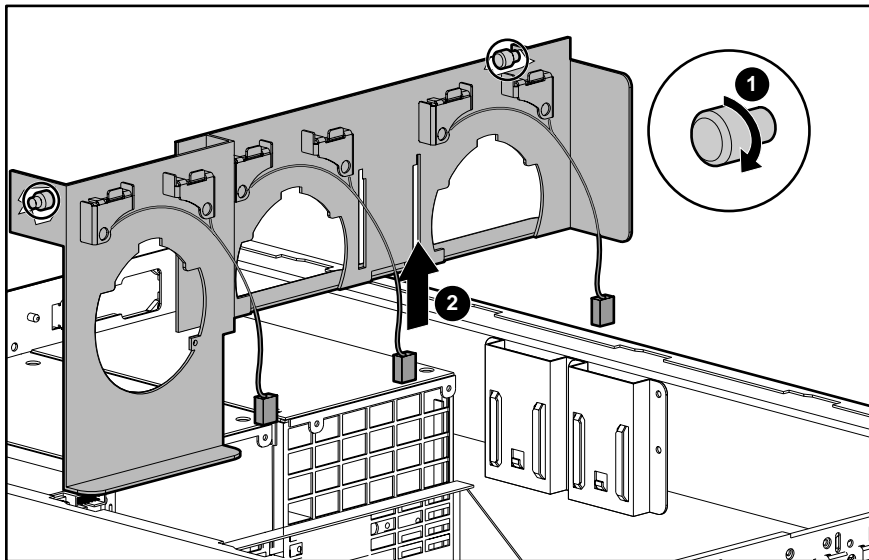


Figure 2-25. Removing the center wall

Reverse steps 1 through 10 to replace the center wall.

SCSI Hard Drive Backplane Board

To remove the SCSI hard drive backplane board:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the center wall. See “Center Wall” earlier in this chapter.
3. Disconnect the SCSI and power cables ❶ from the SCSI hard drive backplane board.
4. Remove the thumbscrew ❷ securing the SCSI hard drive backplane board to the hard drive cage.
5. Pull the SCSI hard drive backplane board ❸ up, then away ❹ from the drive cage area of the chassis.

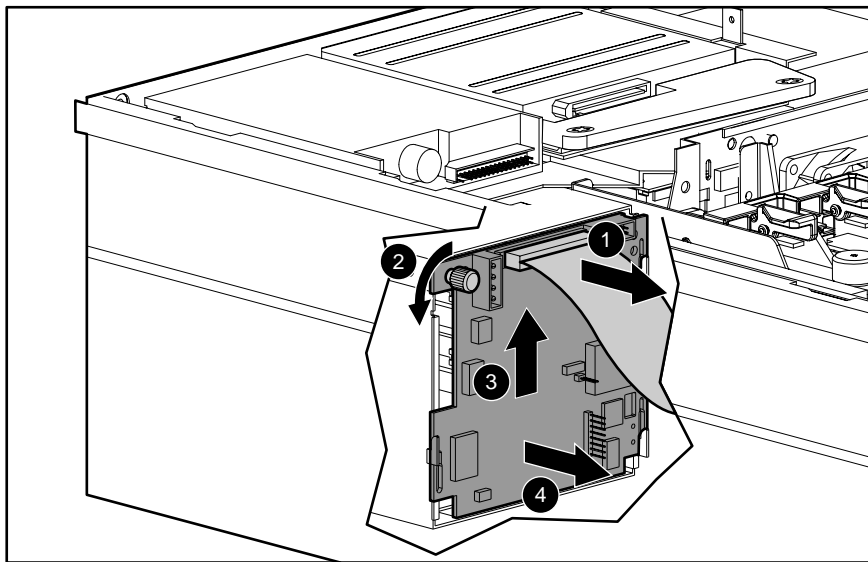


Figure 2-26. Removing the SCSI hard drive backplane board

Reverse steps 1 through 5 to replace the SCSI hard drive backplane board.

Wide Ultra2/Ultra3 Hard Drive Cage

NOTE: The ProLiant DL580 supports Wide Ultra3 SCSI technology.

To remove the Wide Ultra2/Ultra3 hard drive cage:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the three T-15 screws ❶ located on the front bezel that secure the drive cage to the front of the chassis.
3. Remove the center wall. See “Center Wall” earlier in this chapter.
4. Pull the drive cage ❷ toward the rear of the server to clear the two lower tabs, then lift the drive cage up and away from the chassis.

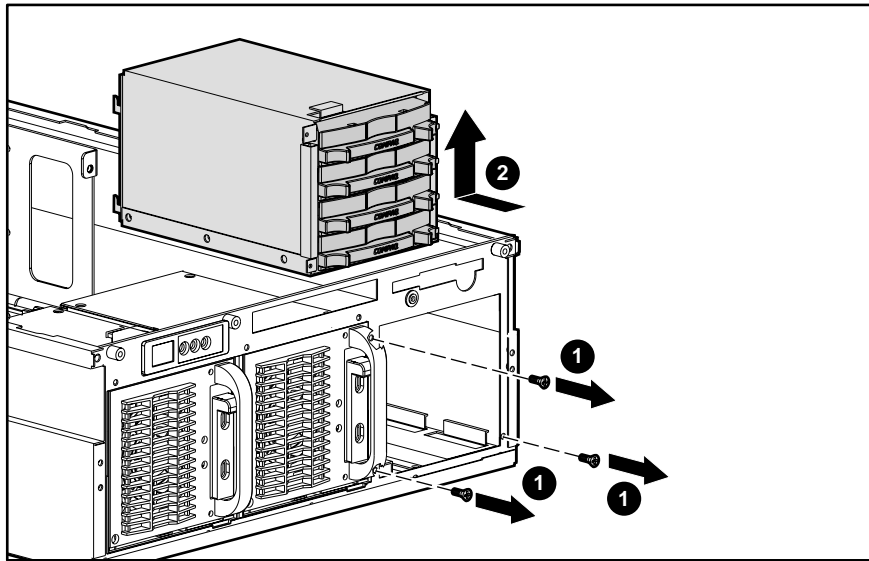


Figure 2-27. Removing the Wide Ultra2/Ultra3 hard drive cage from the chassis

Reverse steps 1 through 4 to replace the Wide Ultra2/Ultra3 hard drive cage.

PCI Expansion Boards

PCI Hot Plug Expansion Boards



CAUTION: Do not attempt a PCI Hot Plug procedure if your operating system does not provide PCI Hot Plug support, or if you do not have the appropriate device drivers installed. Failure to take these precautions causes system shutdown and risks data integrity.



CAUTION: To avoid critical errors, do not open the slot release lever if the green power LED is on or blinking. Use the PCI Hot Plug button or the software application to turn off power to the slot.

Use either the PCI Hot Plug button on the server or the operating system PCI Hot Plug utility to control the PCI Hot Plug slots.

- The PCI Hot Plug button and the PCI Hot Plug utility allow power to the PCI Hot Plug slot to be powered on or off. However, the PCI Hot Plug button allows direct access at each PCI Hot Plug slot. Figure 2-28 shows the hot-plug and non-hot-plug slot locations on the system board. Table 2-7 identifies the slots.
- PCI Hot Plug software support for each operating system is available online. For more information, see the “PCI Hot Plug Important Facts” section in the online PCI Hot Plug Administration Guide on the Server Documentation CD.

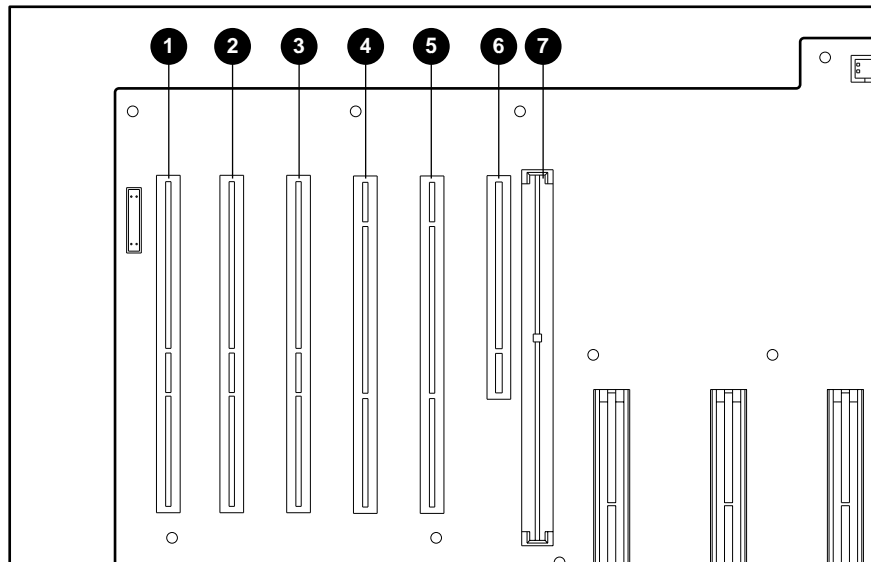


Figure 2-28. Hot-plug and non-hot-plug slots on the system board

Table 2-7
Hot-Plug and Non-Hot-Plug Slot Locations

| Item | Description |
|------|--|
| ❶ | Slot 1 with secondary PCI bus (non-hot-plug) |
| ❷ | Slot 2 with secondary PCI bus |
| ❸ | Slot 3 with secondary PCI bus |
| ❹ | Slot 4 with tertiary PCI bus |
| ❺ | Slot 5 with tertiary PCI bus (NIC standard location) |
| ❻ | Slot 6 with primary PCI bus (non-hot-plug) |
| ❼ | Peripheral board connector (non-hot-plug) |



WARNING: To reduce the risk of injury or damage to the equipment from hazardous energy. The hot-plug access door provides access to hazardous energy circuits. The door should remain locked during normal operation or the server should be installed in a controlled access location where only qualified personnel have access to the server.



WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

To remove a PCI Hot Plug expansion board:

1. Unlock and open the PCI Hot Plug access door.

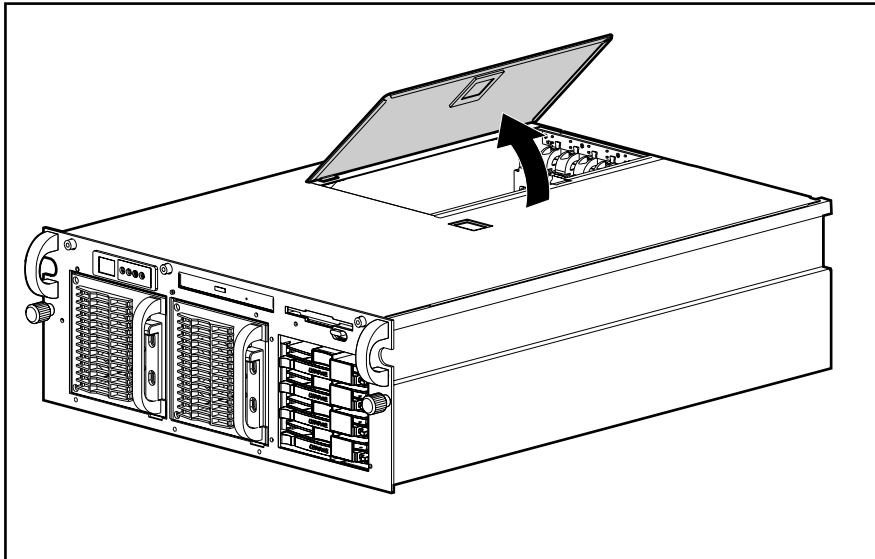


Figure 2-29. Opening the PCI Hot Plug access door

2. Before removing a PCI Hot Plug expansion board or a network interface controller (NIC), check the PCI Hot Plug LED indicator. If the expansion board is seated, the slot LED indicator should be green. See Chapter 4, “Connectors, Switches, and LED Indicators,” for further information on PCI Hot Plug LED indicators.
3. If the PCI Hot Plug LED indicator is not green, power down the slot by pressing the PCI Hot Plug button or using the PCI Hot Plug utility.

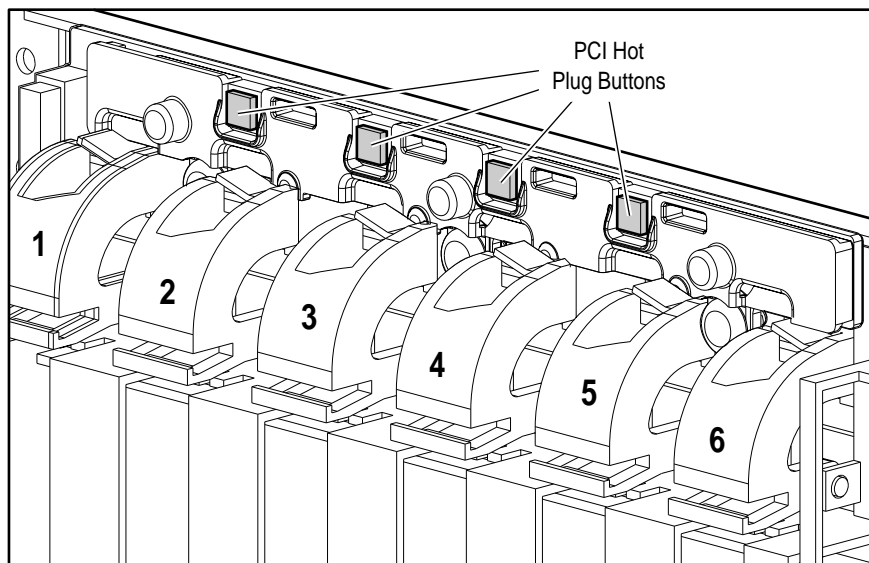


Figure 2-30. PCI Hot Plug buttons (top access cover removed for clarity)

NOTE: Slots 1 and 6 are non-hot-pluggable.

4. Wait until both the green and amber LED indicators are off.



CAUTION: If the green power LED indicator is on, do not open the slot release lever. The PCI Hot Plug button allows for PCI Hot Plug access directly at each PCI slot. A PCI Hot Plug button is located above each PCI slot, providing PCI Hot Plug control at the server, eliminating the use of the PCI Hot Plug utility software. **Do not** open the slot release lever unless the green PCI Hot Plug LED indicator on the slot is off. System power down and subsequent data loss can occur.

NOTE: The PCI Hot Plug button can be pressed again within 5 seconds to cancel an action.

5. Press the release tab ❶ of the appropriate expansion board slot release lever.
6. Rotate the lever ❷ toward the rear of the expansion board slot.
7. Holding the board at each end, carefully rock it back and forth until the connectors pull free from the slot.
8. Lift the PCI expansion board ❸ from the chassis.

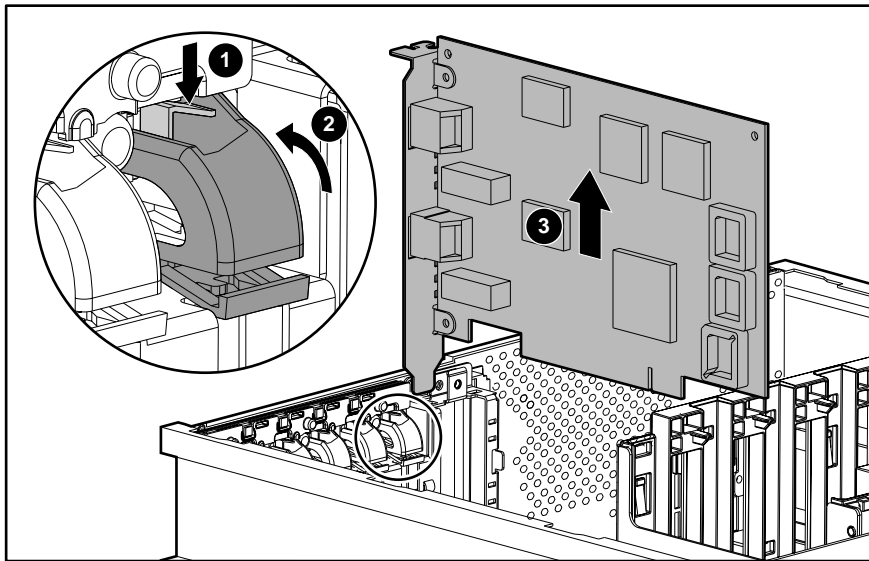


Figure 2-31. Removing a PCI Hot Plug expansion board

Reverse steps 1 through 8 to replace a PCI Hot Plug expansion board.

IMPORTANT: Installing a 33-MHz expansion board into either of the 66-MHz slots (4 and 5) decreases the bus speed in both slots to 33 MHz.

Non-Hot-Plug Expansion Boards

To remove non-hot-plug expansion boards:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the top access panel. See “Top Access Panel” earlier in this chapter.

Refer to steps 5 through 8 in “PCI Expansion Boards” earlier in this section.

PCI Hot Plug Basket Insulator



WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

To remove the PCI Hot Plug basket insulator:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the top access panel. See “Top Access Panel” earlier in this chapter.
3. Remove all PCI boards. See “PCI Expansion Boards” earlier in this chapter.
4. Pull up the two pushpins ❶ securing the PCI Hot Plug basket insulator to the chassis.
5. Push down on the rear on the basket, then pull the basket ❷ toward the front of the unit to release the two rear clips that secure the back of the basket to the chassis.
6. Lift out the PCI Hot Plug basket insulator ❸.

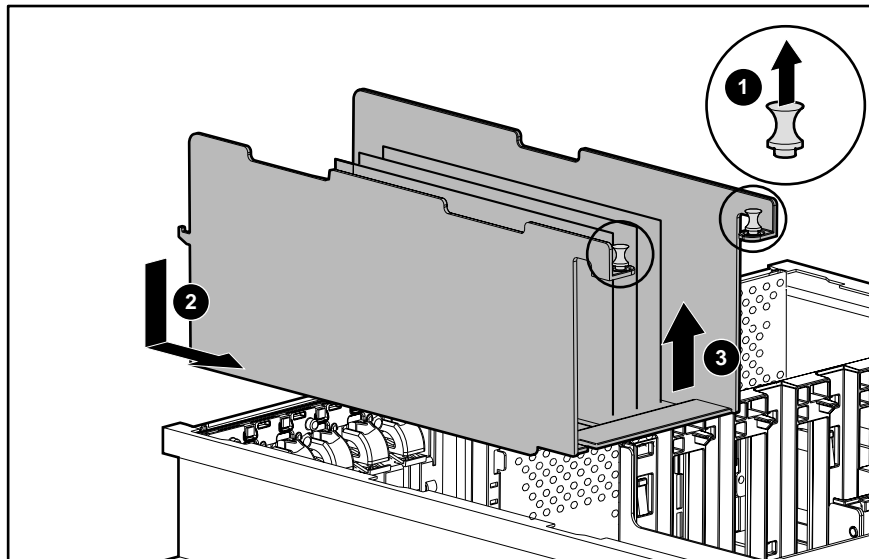


Figure 2-32. Removing the PCI Hot Plug basket insulator

Reverse steps 1 through 6 to replace the PCI Hot Plug basket insulator.

PCI Hot Plug LED Switchboard and Cable

To remove the PCI Hot Plug LED switchboard and cable:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the top access panel. See “Top Access Panel” earlier in this chapter.
3. Remove all PCI Hot Plug expansion boards. See “PCI Expansion Boards” earlier in this chapter.
4. Disconnect the PCI Hot Plug LED switchboard cable ❶.
5. Remove the three T-15 screws ❷ that secure the PCI Hot Plug LED switchboard to the chassis.
6. Pull the PCI Hot Plug LED switchboard ❸ up, then lift the switchboard out from the chassis.

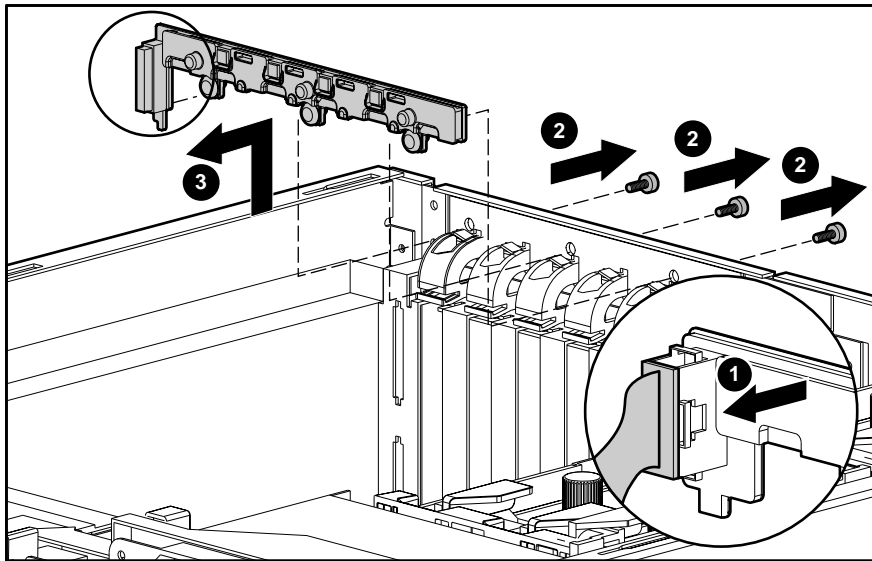


Figure 2-33. Removing the PCI Hot Plug LED switchboard and cable

Reverse steps 1 through 6 to replace the PCI Hot Plug LED switchboard and cable.

PCI Guide Bracket

To remove the PCI guide bracket:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the hot-plug fan assembly 1 and 2. See “Hot-Plug Fan Assembly Identification” and “Hot-Plug Fan Assemblies” earlier in this chapter.
3. Remove all PCI expansion boards. See “PCI Expansion Boards” earlier in this chapter.
4. Remove the PCI Hot Plug basket insulator. See “PCI Hot Plug Basket Insulator” earlier in this chapter.
5. Remove the peripheral board. See “Peripheral Board” earlier in this chapter.
6. Loosen the two captive thumbscrews ❶ securing the PCI guide bracket, then lift the guide bracket ❷ away from the chassis.

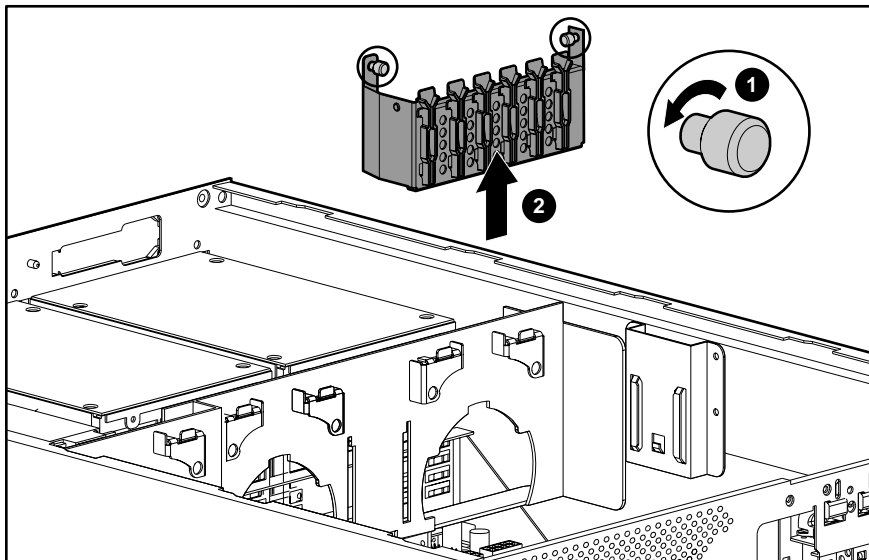


Figure 2-34. Removing the PCI guide bracket

Reverse steps 1 through 6 to replace the PCI guide bracket.

Power Backplane Board

To remove the power backplane board:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Pull all power supplies partially out of the unit. See “Hot-Plug Power Supply” earlier in this chapter.
3. Remove the PCI guide bracket. See “PCI Guide Bracket” earlier in this chapter.
4. Remove the center wall. See “Center Wall” earlier in this chapter.
5. Disconnect all remaining cables from the power backplane board assembly.
6. Remove the four T-15 screws ❶ that secure the backplane board to the backplane board subpan, then lift the backplane board ❷ from the subpan.

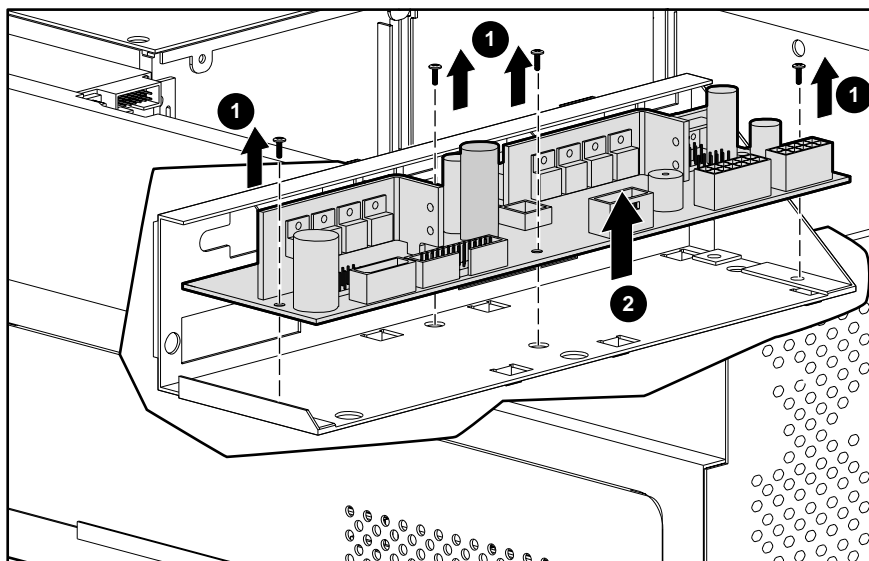


Figure 2-35. Removing the power backplane board from the subpan

Reverse steps 1 through 6 to replace the power backplane board assembly.

System Board with Subpan



CAUTION: Carefully remove the system board with subpan to avoid dislodging components from the system board.

To remove the system board with subpan:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the top access panel. See “Top Access Panel” earlier in this chapter.
3. Remove the PCI Hot Plug basket insulator. See “PCI Hot Plug Basket Insulator” earlier in this chapter.
4. Remove the memory board. See “Memory Board” earlier in this chapter.
5. Remove the peripheral board. See “Peripheral Board” earlier in this chapter.
6. Remove all hot-plug fan assemblies. See “Hot-Plug Fan Assemblies” earlier in this chapter.
7. Remove the PCI guide bracket. See “PCI Guide Bracket” earlier in this chapter.
8. Disconnect the rear fan cable ❶ from the system board.
9. Loosen the two thumbscrews ❷ that secure the processor cage to the chassis.
10. Loosen the three thumbscrews ❸ securing the system board and tray to the chassis.
11. Pull the system board with subpan ❹ forward, then pivot one side of the system board ❺ up, and then lift the board out of the chassis area.

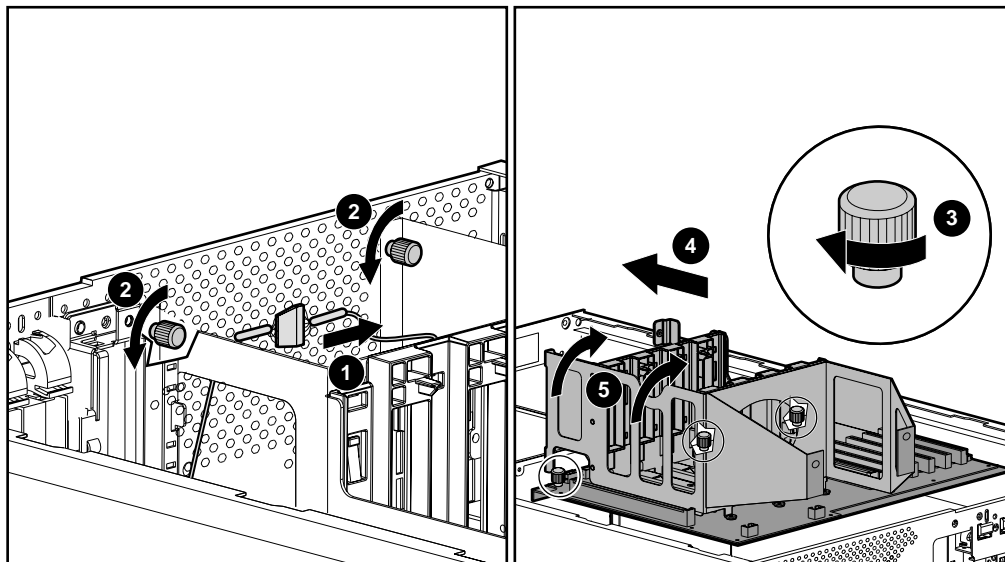


Figure 2-36. Removing the system board with subpan

Reverse steps 1 through 11 to replace the system board with subpan.

Processor Cage

To remove the processor cage:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the system board with subpan. See “System Board with Subpan” earlier in this chapter.
3. Remove all processors and processor terminator modules. See “Processors and Processor Terminator Modules” earlier in this chapter.
4. Remove the seven T-15 screws **1** that secure the processor cage to the system board with subpan.
5. Lift the processor cage **2** from the system board.

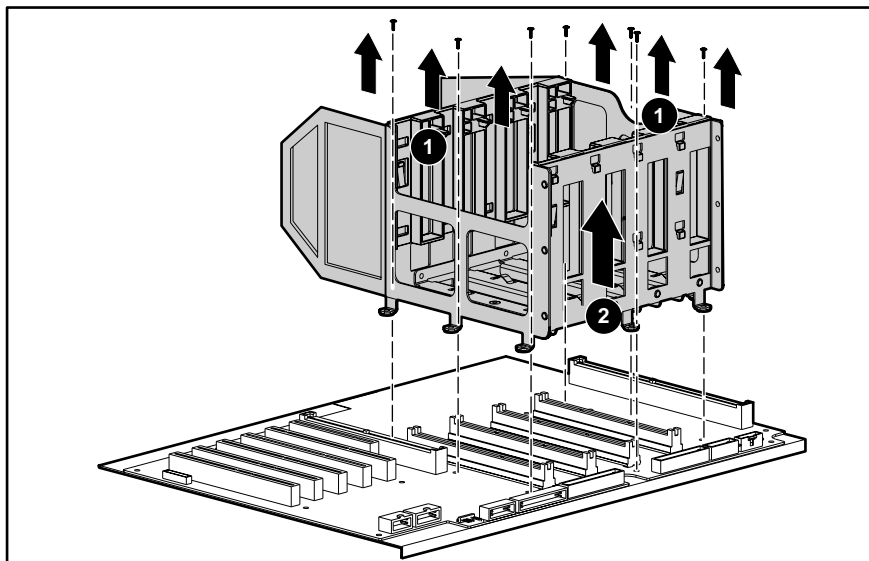


Figure 2-37. Removing the processor cage from the system board

Reverse steps 1 through 5 to replace the processor cage.

AC Power Cable Assembly

To remove the AC power cable assembly:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the primary power supply cable ❶ and the secondary power supply cable ❷ from the two rear power outlets. Cut the plastic tie wrap securing the cable if there is one.

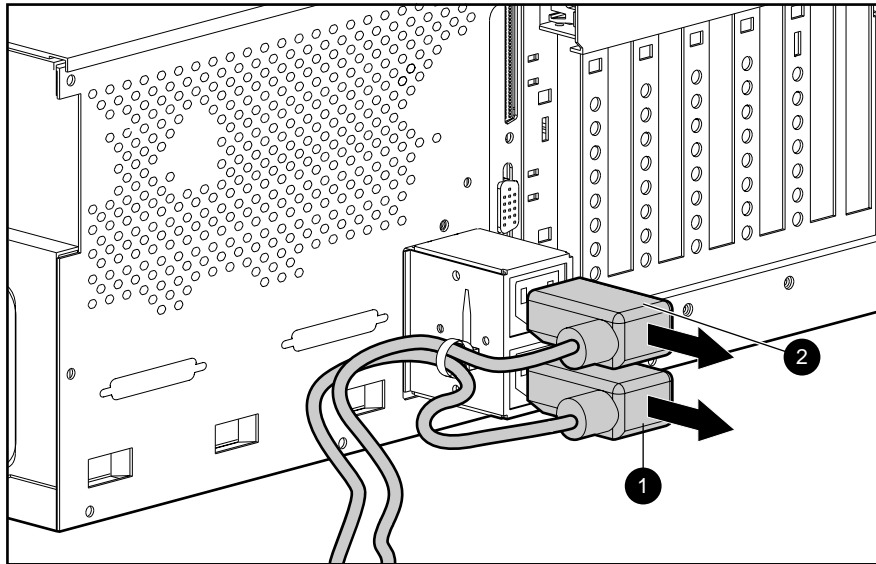


Figure 2-38. Removing the AC power supply cables

3. Remove all hot-plug power supplies. See “Hot-Plug Power Supply” earlier in this chapter.
4. Remove all hot-plug fan assemblies. See “Hot-Plug Fan Assemblies” earlier in this chapter.
5. Remove the PCI guide bracket. See “PCI Guide Bracket” earlier in this chapter.
6. Remove the center wall. See “Center Wall” earlier in this chapter.
7. Remove the system board and tray. See “System Board with Subpan” earlier in this chapter.

8. Loosen the four AC power cord bracket thumbscrews ③ that secure the AC power cords to the power backplane board.
9. Pull the two AC power cords ④ out from the power backplane board sheet metal bracket.

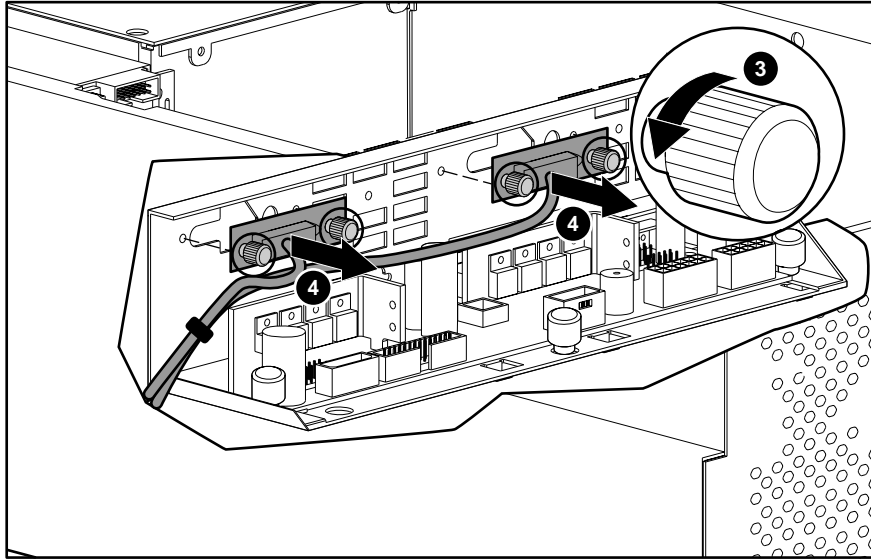


Figure 2-39. Unplugging the two AC power cords from the power backplane board

10. Remove the T-15 ground wire screw ⑤ from the plug assembly, then lift the cover up and away from the plug assembly.

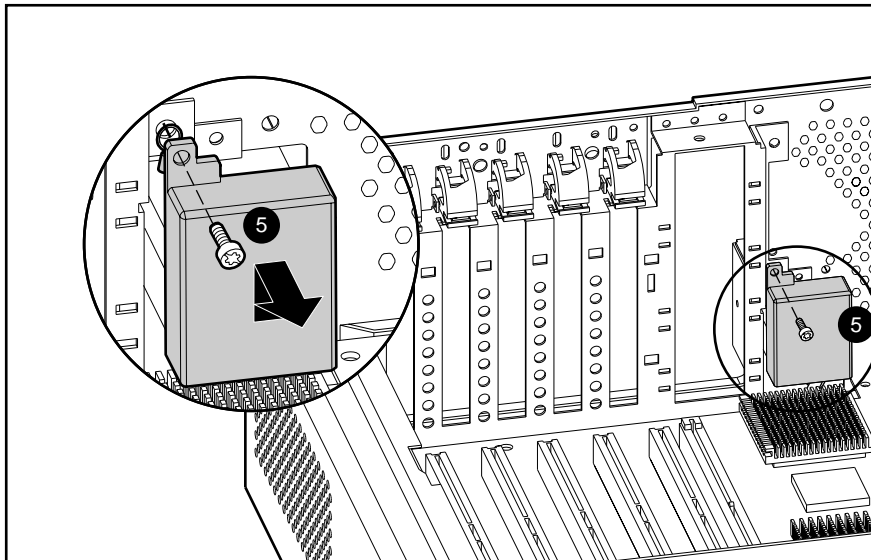


Figure 2-40. Removing the T-15 ground wire screw from the plug assembly

11. Remove the two T-15 screws ⑥ securing the plug assembly connector to the chassis, then push in the plug assembly ⑦.

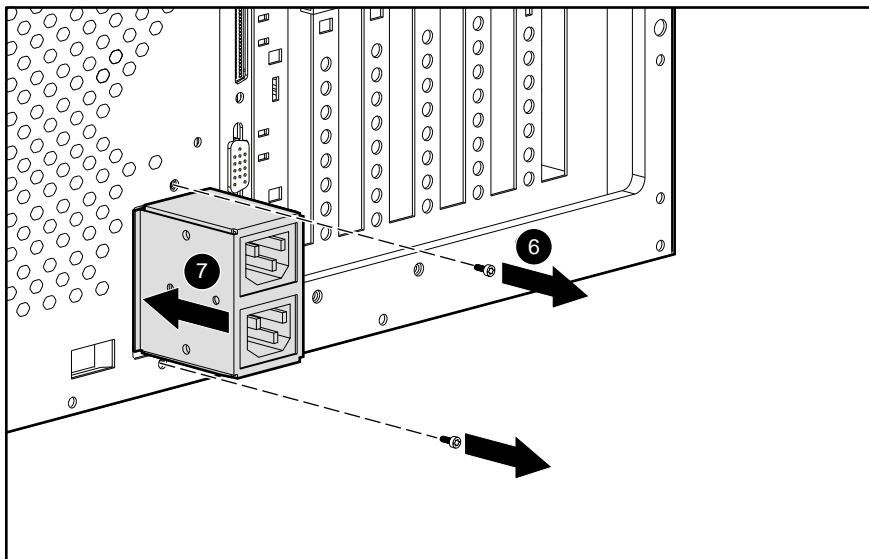


Figure 2-41. Removing the AC power supply connector from the chassis

12. Pull the AC power cord and plug assembly ⑧ back, then out of the chassis.

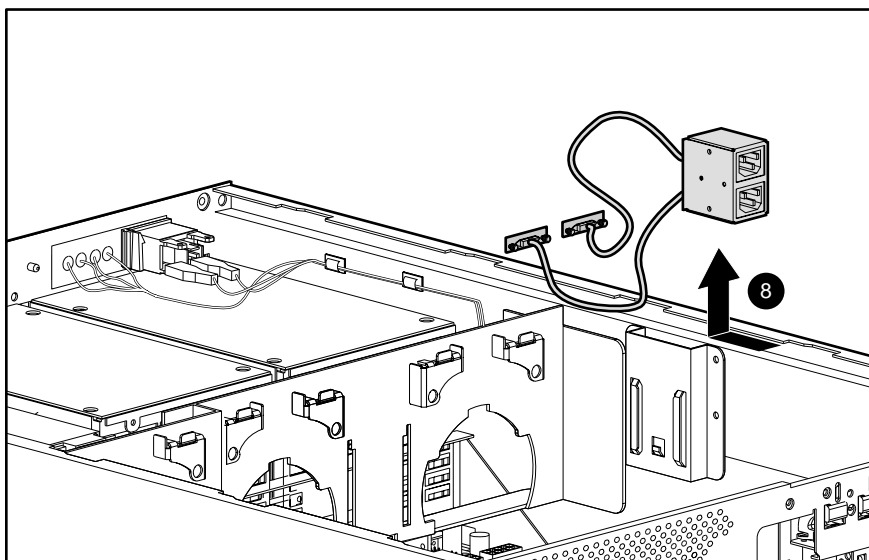


Figure 2-42. Removing the AC power cable assembly from the chassis

Reverse steps 1 through 12 to replace the AC power cord and plug assembly.

Integrated Smart Array Controller Features

The Compaq Integrated Smart Array Controller is a dual-channel controller supporting Redundant Array of Inexpensive Disks (RAID) technology.

The Integrated Smart Array Controller supports the following features:

- 12-MB total memory, 8-MB read-ahead cache
- 32-bit Peripheral Component Interface (PCI) bus master interface
- RAID 0, RAID 0+1, RAID 1, and RAID 5 disk-fault tolerance
- Support for up to four internal SCSI Wide Ultra 2 hot-plug hard drives
- Array transfer capability to the Compaq Smart Array 4200 controller
- Array Configuration Utility (ACU)
- Migration from any RAID level to any other RAID level
- Migration from any stripe size to any other stripe size
- Online capacity expansion
- Online spares

Integrated Smart Array Controller



WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching.

To remove the Integrated Smart Array Controller:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the top access panel. See “Top Access Panel” earlier in this chapter.
3. Locate the Integrated Smart Array Controller on the peripheral board. Remove any power or data cables that may prevent accessibility to the controller. See “Cable Routing Diagrams” earlier in this chapter.
4. Pull the side tabs **1** apart to release the controller from the peripheral board slot.
5. Lift the controller **2** away from the system board slot.

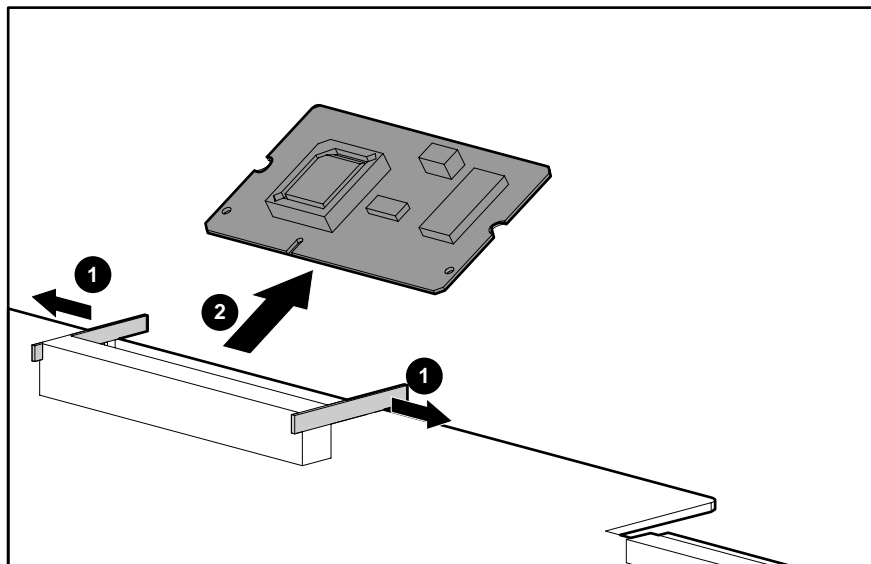


Figure 2-43. Removing the Integrated Smart Array Controller

Reverse steps 1 through 5 to replace the Integrated Smart Array Controller.

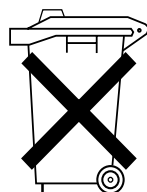
Replacement Battery

The replacement battery periodically must be changed to ensure optimum performance.



WARNING: This computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. There is risk of fire and burns if the battery pack is not handled properly. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
 - Do not expose the battery to temperatures higher than 60°C.
 - Do not disassemble, crush, puncture, short external contacts, or dispose of the battery in fire or water.
 - Replace the battery only with the Compaq spare battery designated for this product.
-



CAUTION: Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, please use the public collection system or return them to Compaq, your authorized Compaq partners, or their agents.

To install the replacement battery:

1. Perform the preparation procedures. See “Preparation Procedures” earlier in this chapter.
2. Remove the top access panel. See “Top Access Panel” earlier in this chapter.
3. Remove the peripheral board. See “Peripheral Board” earlier in this chapter.



WARNING: Disconnect all the power cords to completely remove power from the system. Disconnect the power cord from the server before removing the peripheral board.

4. Remove the lithium manganese dioxide battery from the peripheral board.



CAUTION: Loss of BIOS settings occurs when the flat disk battery is removed. BIOS settings must be reconfigured whenever the battery is replaced.

5. Snap the replacement battery into the battery connector on the peripheral board.

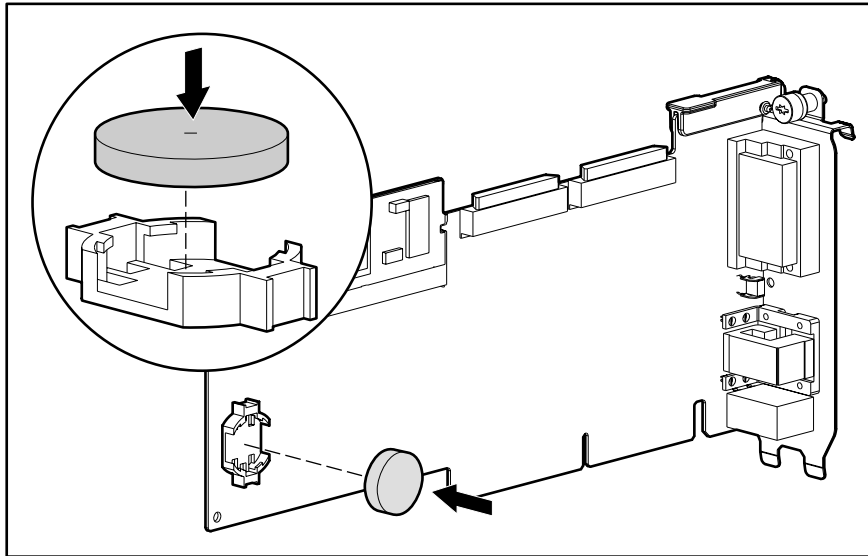


Figure 2-44. Installing the replacement battery

6. Place the sticker included with the battery kit on the back of the server above the power connector.
7. Run the System Configuration Utility to reconfigure the system. See Chapter 3, “Diagnostics and Troubleshooting,” for more information.

Chapter **3**

Diagnostics and Troubleshooting

This chapter describes software and firmware diagnostic tools available for all Compaq server products. The sections in this chapter are:

- Diagnostic Tools Utility Overview
- Default Configuration
- INSPECT
- Utilities Access
- Power-On Self-Test
- Diagnostics Software
- Array Diagnostic Utility
- Integrated Management Log
- Rapid Error Recovery
- Remote Management Features
- *ROMPaq*[™] Error Recovery Options
- *Compaq Insight Manager*[™]

Diagnostic Tools Utility Overview

These utilities were developed to assist in diagnosing problems, testing the hardware, and monitoring and managing Compaq server hardware.

Table 3-1
Diagnostic Tools

| Tool | What it is | How to run it |
|---|--|---|
| Compaq Diagnostics Program | Utility to assist testing and verifying operation of Compaq hardware. If problems are found, Compaq Diagnostics isolates failure(s) down to the replaceable part, whenever possible. | Diagnostics and utilities are located on a partition on the hard drive and must be accessed when a system configuration error is detected during Power-On Self-Test (POST). Compaq Diagnostics software is also available on the Compaq <i>SmartStart</i> [™] and Support Software CD. A Diagnostics diskette can be created from the SmartStart and Support Software CD, and Diagnostics run from diskette. |
| INSPECT | INSPECT provides a report detailing system information. | INSPECT can be run from either the main menu of the System Configuration Utility or the Compaq Diagnostics program. |
| Compaq Insight Manager AND Compaq Insight Manager Agent | A client/server application used to remotely manage Compaq hardware in a network environment. Reports hardware fault conditions (both failure and prefailure) and collects data for reporting and graphing. | For more information, refer to the Compaq Management CD and the <i>Compaq Insight Manager User Guide</i> . More information on viewing and printing the event list can be found in the "Compaq Insight Manager" section of this chapter. |
| Compaq Survey Utility | An online information gathering agent that runs on servers, gathering critical hardware and software information from various sources. A utility for servers running Microsoft Windows NT or Novell NetWare. If a significant change occurs between data gathering intervals, previous information is marked, and the <i>survey text file</i> is overwritten to reflect the latest configuration and changes since last configuration. This allows a historical record of change events for server hardware and software. | Install the Compaq Integration Maintenance Utility from SmartStart, or from the Compaq Management CD. |

continued

Table 3-1
Diagnostic Tools *continued*

| Tool | What it is | How to run it |
|---|--|---|
| Array Diagnostics Utility (ADU) | <p>A Windows-based tool designed to run on all Compaq servers that support Compaq array controllers and are running SmartStart 4.10 or later. Two main functions of ADU are to collect all possible information about the array controllers in the system, and generate a list of detected problems.</p> <p>This tool is available for all Compaq servers covered by this guide.</p> | Use the information provided in ADU later in this chapter. |
| Drive Array Advanced Diagnostics (DAAD) | <p>The predecessor to ADU, DAAD is a DOS-based tool for Compaq servers with Smart Array Controllers. DAAD collects information about the array controllers in the system and offers a list of detected problems.</p> | <p>For a list of Compaq servers still supported by this tool, visit the Compaq website:</p> <p>http://www.compaq.com/support/files/servers/softpaqs/rompaq/daad.html</p> |
| Integrated Management Log (IML) | <p>A log of system events, such as system failures or nonfatal error conditions. View events in the IML:</p> <ul style="list-style-type: none"> ■ On the Integrated Management Display ■ From within Compaq Insight Manager ■ From within Compaq Survey Utility | <p>The IML requires Compaq operating system-dependent drivers. Refer to the Compaq Support Software CD for instructions on installing the appropriate drivers.</p> |
| System Configuration Utility (SCL) | <p>Utility to easily configure the hardware installed in or connected to the server. Specifically, it can:</p> <ul style="list-style-type: none"> ■ Resolve resource conflicts in areas such as memory, port addresses, and interrupts (IRQs) ■ Automatically configure PCI boards ■ Manage installation of processor upgrades, and mass storage devices such as hard drives, tape drives, and diskette drives ■ Store configuration information in nonvolatile memory ■ Assist in installation of an operating system ■ Assist in running diagnostic tools such as Test and INSPECT ■ Assist in reconfiguring a server that cannot otherwise be restored | <p>If the server has a bootable CD-ROM drive, run Compaq System Configuration Utility directly from the Support Software CD supplied with the Compaq Smart Array Controller Option Kit, or SmartStart and the Support Software CD supplied with server. Use the CD supplied for the latest version.</p> <p>If the server does not have a bootable CD-ROM drive, create diskettes with latest version of the System Configuration Utility from the Support Software CD, or the SmartStart and Support Software CD.</p> |

Default Configuration

When the system is first powered up, the system ROM detects the unconfigured state of the hardware and provides default configuration settings for most devices. By providing this initialization, the system can run Diagnostics and other software applications before running the normal SmartStart and System Configuration programs.

Default Configuration Messages

IMPORTANT: If you chose to format and partition the boot drive before running SmartStart and the System Configuration programs, this action prohibits creating a System Partition and the offline remote management features that it provides. If a System Configuration, Diagnostics, or SmartStart and Support Software CD is in the CD-ROM drive prior to powering up the server, the system ROM powers up to that utility.

If the system ROM does not detect one of those CDs, you are prompted for the intended operating system. The system restarts if any operating system-dependent configurations have changed with the new operating system selection. If the selected operating system-dependent configurations are the same as the current configurations, the system starts normally. If you enter a wrong choice, on subsequent restarts you may change the operating system.

INSPECT

INSPECT provides configuration information such as the contents of the operating system (OS) startup files, current memory configuration, ROM version, and Integrated Management Log (IML) information. It operates with MS-DOS and in the MS-DOS emulation mode of MS OS/2.

Running INSPECT

1. Power down the server, then power up, and then press **F10** when the cursor displays in the upper right corner of the screen.
2. At the main menu, select Diagnostics and Utilities.
3. Press **Enter**.
4. Select Inspect Computer, and then press **Enter**.

NOTE: If Diagnostics is not installed on the hard drive, System Configuration prompts you to insert the Diagnostics diskette into drive A.

5. Follow the instructions. The first time the INSPECT displays, select Entire System, and then press **Enter**.

Printing the INSPECT Listing

Select Print on the INSPECT screen to print a copy of the INSPECT listing. Keep a copy of the listing with each server for later reference.

Utilities Access

The SmartStart and Support Software CD contains the SmartStart program and many of the Compaq utilities needed to maintain the system, including:

- System Configuration Utility
- Array Configuration Utility
- Array Diagnostic Utility (ADU)
- ROMPaq Firmware Upgrade Utilities
- Compaq Diagnostics



CAUTION: Do not select the Erase utility when running the SmartStart and Support Software CD. The erase utility causes data loss to the entire system.

Running the Utilities from the System Partition

If the system is installed with SmartStart, the Compaq utilities are automatically available on the system partition. The system partition could also have been created during a manual system installation.

To run the utilities on the system partition, start the system, and then press **F10** when you see:

Press F10 for system partition utilities.

Then select the desired utility from one of the following menus:

- System Configuration menu
 - System Configuration Utility
 - Array Configuration Utility
- Diagnostics and Utilities menu
 - Compaq Diagnostics (Test and INSPECT)
 - The ROMPaq Firmware Upgrade Utility

Running the Utilities from Diskette

- Run the utilities from their individual diskettes. If you have a utility diskette newer than the version on the SmartStart and Support Software CD, use that diskette.
- Create a diskette version of the utility from the SmartStart and Support Software CD.

To create diskette versions of the utilities from the CD:

1. Start the Compaq SmartStart and Support Software CD.
2. From the Compaq System Utilities screen, select Create Support Software Disks, and then select Next.
3. Select the diskette you would like to create from the list, and then follow the instructions on the screen.

Running the Utilities from the Compaq SmartStart and Support Software CD

IMPORTANT: Only the System Configuration Utility, the Array Configuration Utility, and the Array Diagnostic Utility (ADU) can be executed from the SmartStart and Support Software CD. All other utilities must be executed from either the system partition or from diskette.

To run these utilities directly from the SmartStart and Support Software CD:

1. Start the SmartStart and Support Software CD.
2. From the System Utilities screen, select the utility you wish to run, and then select Next.
 - To execute the System Configuration Utility, select Run System Configuration Utility.
 - To execute the Array Configuration Utility, select Run Array Configuration Utility.
 - To execute the Array Diagnostic Utility (ADU), select Run Array Diagnostic Utility.

Power-On Self-Test

Power-On Self-Test (POST) is a series of diagnostic tests that automatically run on Compaq computers when the system is powered up. POST checks the following assemblies to ensure that the computer system is functioning properly:

- System ROM
- Keyboard
- Power supply
- System board
- Memory
- Memory expansion boards
- Controllers
- Diskette drives
- Hard drives
- Fans

POST Error Messages

If POST finds an error in the system, an error condition is indicated by an audible and visual message. If an error code displays on the screen during POST or after resetting the system, use the instructions in the POST Error Messages table (Table 3-2).

NOTE: Many of the actions listed require you to run Diagnostics or the System Configuration Utility. Steps for running these utilities are provided following the POST Error Messages tables.

The Recommended Action column in Table 3-2 lists the steps necessary to correct the problem. After completing each step, run the Diagnostics program to verify whether the error condition has been corrected. If the error code is redisplayed, perform the next step, and then run the Diagnostics program again. Follow this procedure until Diagnostics no longer detects an error condition.

Table 3-2
POST Error Messages

| Error Code | Audible Beeps | Probable Source of Problem | Recommended Action |
|--|----------------------|---|---|
| A Critical Error occurred prior to this power up | None | A catastrophic system error, which caused the server to crash, has been logged. | Run Diagnostics. Replace failed assembly as indicated. |
| Unsupported Processor Detected System Halted | 1 long, 1 short | Processor not supported by current system ROM | Check documentation for supported processors, and if supported, remove the processor and update the system to latest ROM. |
| FATAL ROM ERROR: The System ROM is not properly programmed | 1 long, 1 short | ROM incorrectly programmed in factory | Replace the physical ROM part. |
| 101-ROM Error | 1 long, 1 short | System ROM checksum | Run Diagnostics, then replace failed assembly as indicated. |
| 101-I/O ROM Error | None | Options ROM checksum | Run Diagnostics, then replace failed assembly as indicated. |
| 102-System Board Failure | None | DMA, timers | Replace the system board. Run the System Configuration Utility. |
| 104-ASR-2 Timer Failure | None | System board failure | Run Diagnostics. Replace failed assembly as indicated. |
| 105-Current System ROM is corrupt – now booting redundant System ROM | 2 long | Nonbooted ROM image is corrupt | Flash the ROM utilizing ROMPaq. |
| 162-System Options Not Set | 2 short | Configuration incorrect | Run the System Configuration Utility and correct. |
| 163-Time & Date Not Set | 2 short | Invalid time or date in configuration memory | Run the System Configuration Utility and correct. |
| 164-Memory Size Error | 2 short | Configuration memory incorrect | Run the System Configuration Utility and correct. |
| 172-Configuration Nonvolatile Memory Invalid | None | Nonvolatile configuration corrupt or jumper installed | Run the System Configuration Utility and correct. |
| 173-Slot ID Mismatch | None | Board replaced, configuration not updated | Run the System Configuration Utility and correct. |
| 174-Configuration/Slot Mismatch Device Not Found | None | EISA or PCI board not found | Run the System Configuration Utility and correct. |
| 175-Configuration/Slot Mismatch Device Found | None | EISA or PCI board added, configuration not updated | Run the System Configuration Utility and correct. |

continued

Table 3-2
POST Error Messages *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Recommended Action |
|---|-----------------|--|--|
| 177-Configuration Not Complete | None | Incomplete system configuration | Run the System Configuration Utility and correct. |
| 178-Processor Configuration Invalid | None | Processor type or step does not match configuration memory. | Run the System Configuration Utility and correct. |
| 180-Log Reinitialized | None | N/A | N/A |
| 201-Memory Error | None | RAM failure | Run Diagnostics, then replace failed assembly as indicated. |
| 203-Memory Address Error | None | RAM failure | Run Diagnostics, then replace failed assembly as indicated. |
| 207-Invalid Memory Configuration – Check DIMM [SIMM] Installation | None | Memory module installed incorrectly | Verify placement of memory modules. |
| 208-Invalid Memory Speed – Check DIMM [SIMM] Installation | 1 long, 1 short | The speed of the memory is too slow: <ul style="list-style-type: none"> ■ xx00 = expansion board SIMMs are too slow ■ 00yy = system board SIMMs are too slow ■ xx and yy have a corresponding bit set | The speed of the memory modules must be 60 ns. Verify the speed of the memory modules installed, and replace if slower than 60 ns. |
| 209-Memory Detection Failure. Check Memory Installation | 1 long, 1 short | Unable to size memory | Check DIMM installation and if error persists, call Compaq authorized service provider. |
| 211-Cache Switch Set Incorrectly | None | Switch not set properly during installation or upgrade | Verify switch settings. |
| 212-System Processor Failed/ Mapped out | 1 short | Processor in slot X failed | Run Diagnostics, then replace failed processor. |
| 218-Cache Accelerators Not Installed. System Halted. | None | Cache accelerators not installed or improperly installed | Check cache accelerator installation. |
| 219-Tag Update Rules SRAM Failure. System Halted | None | Catastrophic chipset failure | Call Compaq authorized service provider. |

continued

Table 3-2
POST Error Messages *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Recommended Action |
|---|----------------------|---|--|
| 219-Snoop Rules SRAM Failure. System Halted. | None | Catastrophic chipset failure | Call Compaq authorized service provider. |
| 220-Cache Accelerator Slot <i>x</i> Initialization Failed. System Halted. | None | Cache accelerator in slot <i>x</i> improperly installed or bad | Check cache accelerator installation and if properly installed, replace. |
| 301-Keyboard Error | None | Keyboard failure | Power down the computer, then reconnect the keyboard. |
| 301-Keyboard Error or Test Fixture Installed | None | Keyboard failure | Replace the keyboard. |
| * ZZ-301-Keyboard Error | None | Keyboard failure | <ol style="list-style-type: none"> 1. A key is stuck. Try to free it. 2. Replace the keyboard. |
| 303-Keyboard Controller Error | None | System board, keyboard, or mouse controller failure | Run Diagnostics, then replace failed assembly as indicated. |
| 304-Keyboard or System Unit Error | None | Keyboard, keyboard cable, or system board failure | <ol style="list-style-type: none"> 1. Make sure the keyboard is attached. 2. Run Diagnostics to determine whether the keyboard, keyboard cable, or system board is in error. 3. Replace the part indicated. |
| 40X-Parallel Port <i>X</i> Address Assignment Conflict | 2 short | Both external and internal ports are assigned to parallel port <i>X</i> . | Run the System Configuration Utility and correct. |
| 601-Diskette Controller Error | None | Diskette controller circuitry failure | <ol style="list-style-type: none"> 1. Make sure the diskette drive cables are attached. 2. Replace the diskette drive and/or cable. 3. Replace the system board. |
| 605-Diskette Drive Type Error | 2 short | Mismatch in drive type | Run the System Configuration Utility to set diskette type correctly. |
| 1151-Com Port 1 Address Assignment Conflict | 2 short | Both external and internal serial ports are assigned to COM1. | Run the System Configuration Utility and correct. |

* ZZ represents the Keyboard Scan Code.

continued

Table 3-2
POST Error Messages *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Recommended Action |
|---|---------------|--|--|
| 1152-Com Port 2, 3, or 4 Address Assignment Conflict | 2 short | Both external and internal serial ports are assigned to COM2, COM3, or COM4. | Run the System Configuration Utility and correct. |
| 1610-Temperature violation detected. Waiting for system to cool | 2 short | Ambient system temperature too hot | Check fan in system environment. |
| 1611-Fan failure detected | 2 short | Required fan not installed or spinning | Check fans. |
| 1611-I/O Fan (Fan X) failure detected | 2 short | I/O fan failed | Replace the failed fan. |
| 1611-CPU Fan (Fan X) failure detected | 2 short | CPU fan failed | Replace the failed fan. |
| 1612-Primary power supply failure | 2 short | Primary power supply has failed. | Replace power supply as soon as possible. |
| 1613-Low System Battery | None | Real-time clock system battery is running low on power. | Run Diagnostics. Replace failed assembly as indicated. |
| 1615-Power Supply Failure, Power Supply Unplugged, or Power Supply Fan Failure in Bay X | None | A power supply has failed. | Replace or check specified power supply. |
| 1617-Fan controller not responding | 2 short | Fan controller failure | Check and replace failed controller assembly. |
| 1617-I/O Fan controller not responding | 2 short | I/O fan controller failure | Check and replace failed controller assembly. |
| 1617-CPU Fan controller not responding | 2 short | CPU fan controller failure | Check and replace failed controller assembly. |
| 1618-PCI slots powered down. Check PCI hot plug enabler connectors. | None | PCI Hot Plug enabler is missing or failed. | Check and replace missing or failed assembly. |
| 1620-Locked SCSI Bus Detected. Verify SCSI bus cabling. System halted. | None | SCSI bus failure | Run Diagnostics. Replace failed assembly as indicated. |
| 1621-Current SCSI bus cable configuration is not recommended | None | Improper SCSI bus cabling | Check documentation for proper SCSI bus cabling. |

continued

Table 3-2
POST Error Messages *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Recommended Action |
|---|---------------|--|---|
| 1622-Internal SCSI Jumper Board Not Installed | None | The system has detected that the array enabler board is not installed. | Install the array enabler board. |
| 1703-SCSI cable error detected. Internal SCSI cable not attached to system board connector. System halted. | None | Incorrect cabling | Ensure that the integrated SCSI controller has SCSI termination attached. |
| 1703-SCSI Cable Error Detected Terminated cable attached to output connector of SCSI backplane. System Halted | None | Terminated cable has erroneously been attached to the output connector of the SCSI backplane. | Remove the terminated cable. |
| 1703-SCSI Cable Error Detected Must be configured for Single backplane, Simplex or Duplex System Halted | None | SCSI cables have been connected in an unsupported configuration. | Reconnect the SCSI cables in a supported configuration. |
| 1703-SCSI Cable Error Detected Simplex Mode detected, but LED cable not installed System Halted | None | LED cable has failed or is not connected properly. | Reconnect or replace the LED cable. |
| 1720-Slot x Drive Array – SMART Drive Detects Imminent Failure SCSI: Port y: SCSI ID x | None | Indicated drive has reported a SMART predictive-failure condition and may fail at some time in the future. | If drive is part of a nonfault-tolerant configuration, back up all data before replacing drive and restore all data afterward. If drive is part of a fault-tolerant configuration do not replace drive unless all other drives in array are online. Press F1 to resume. |

continued

Table 3-2
POST Error Messages *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Recommended Action |
|---|----------------------|--|---|
| 1724-Slot x Drive Array – Physical Drive Position Change(s) Detected – Logical drive configuration has automatically been updated | None | Logical drive configuration has been updated automatically following physical drive position changes. | Press F1 to resume. |
| 1726-Slot x Drive Array – Array Accelerator Memory Size Change Detected | None | Indicates array accelerator configuration has been updated automatically due to replacement of array accelerator (or controller) with one having different memory size. | Press F1 to resume. |
| 1727-Slot x Drive Array – New Logical Drive(s) Attachment Detected. If more than 32 logical drives, this message will be followed by: Auto-configuration failed: Too many logical drives. | None | Controller has detected an additional array of drives that were attached when the power was off. The logical drive configuration information has been updated to add the new logical drives. The maximum number of logical drives supported is 32. Additional logical drives will not be added to the configuration. | Press F1 to resume. |
| 1730-Fixed Disk 0 does not support DMA Mode. | None | Hard drive error | Run the System Configuration Utility and correct. |
| 1731-Fixed Disk 1 does not support DMA Mode. | None | Hard drive error | Run the System Configuration Utility and correct. |
| 1740-Fixed Disk 0 failed Set Block Mode command | None | Hard drive error | Run the System Configuration Utility and correct. |
| 1741-Fixed Disk 1 failed Set Block Mode command | None | Hard drive error | Run the System Configuration Utility and correct. |
| 1750-Fixed Disk 0 failed Identify command | None | Hard drive error | Run the System Configuration Utility and correct. |
| 1751-Fixed Disk 1 failed Identify command | None | Hard drive error | Run the System Configuration Utility and correct. |
| 1760-Fixed Disk 0 does not support Block Mode | None | Hard drive error | Run the System Configuration Utility and correct. |

continued

Table 3-2
POST Error Messages *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Recommended Action |
|--|---------------|---|--|
| 1761-Fixed Disk 1 does not support Block Mode | None | Hard drive error | Run the System Configuration Utility and correct. |
| 1764-Slot x Drive Array – Capacity Expansion Process is temporarily disabled (followed by any one of these statements): <ul style="list-style-type: none"> ■ Expansion will resume when Array Accelerator has been reattached. ■ Expansion will resume when Array Accelerator has been replaced. ■ Expansion will resume when Array Accelerator RAM allocation is successful. ■ Expansion will resume when Array Accelerator battery reaches full charge. ■ Expansion will resume when automatic data recovery has been completed. | | Reattach or replace array accelerator, wait until the array accelerator batteries have charged, or for Automatic Data Recovery to complete, as indicated. | |
| 1765-Slot x Drive Array Option ROM Appears to Conflict with an ISA Card. ISA cards with 16-bit memory cannot be configured in memory range C0000 to DFFFF along with the SMART-2/E 8-bit Option ROM due to EISA bus limitations. Please remove or reconfigure the ISA card. | | | Remove or reconfigure conflicting ISA cards. Disable “shared memory” on any ISA network cards that may be installed. |
| 1766-Slot x Drive Array requires System ROM Upgrade. Run Systems ROMPaq Utility. | | | Run the latest Systems ROMPaq Utility to upgrade the System ROMs. |
| 1767-Slot x Drive Array Option ROM is Not Programmed Correctly or may Conflict with the Memory Address Range of an ISA Card. Check the Memory Address Configuration of installed ISA Card(s) or run Options ROMPaq Utility to attempt SMART-2/E Option ROM Reprogramming. | | | Remove or reconfigure conflicting ISA cards, especially any cards that are not recognized by the System Configuration Utility. Try reprogramming the ROM on the SMART-2/E Controller using the latest Options ROMPaq (version 2.29 or higher). |
| 1768-Slot x Drive Array-Resuming logical drive expansion process. | None | SMART-2 Controller error | No action required. Displays whenever a controller reset or power cycle occurs while array expansion is in progress. |
| 1769-Slot x Drive Array – Drive(s) disabled due to failure during expand. Select F1 to continue with logical drives disabled. Select F2 to accept data loss and to re-enable logical drives. | None | SMART-2 Controller error. Data has been lost while expanding the array; therefore, the drives have been temporarily disabled. | Press F2 to accept the data loss and re-enable the logical drives. Restore data from backup. |

continued

Table 3-2
POST Error Messages *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Recommended Action |
|---|---------------|---|--|
| 1771-Primary Disk Port Address Assignment Conflict | None | Internal and external hard drive controllers are both assigned to the primary address. | Run the System Configuration Utility and correct. |
| 1772-Secondary Disk Port Address Assignment Conflict | None | Address Assignment Conflict. Internal and external hard drive controllers are both assigned to the secondary address. | Run the System Configuration Utility and correct. |
| 1773-Primary Fixed Disk Port Assignment Conflict | None | Fixed disk drive error | Run the System Configuration Utility and correct. |
| 1774-Slot x Drive Array – Obsolete data found in Array Accelerator. Select F1 to discard contents of Array Accelerator. Select F2 to write contents of Array Accelerator to drives. | None | SMART-2 Controller error | Data found in array accelerator is older than data found on drives. Press F1 to discard the older data in the array accelerator and retain the newer data on the drives. |
| 1775-Slot x Drive Array – ProLiant Storage System Not Responding SCSI Port (y): Check storage system power switch and cables. Turn the system power off while checking the ProLiant power and cable connections, then turn the system power back on to retry. | None | Storage system problem | Power down the system. Check external ProLiant power switch – external drives must all be powered up before or at the same time as the main system. Check cables. If retry does not help, try replacing the cable, ProLiant firmware, ProLiant backplane, or the Smart Array Controller. |
| 1776-Drive Array SCSI Port Termination Error | None | External and internal SCSI drives are both configured to Port 1. | Reconfigure drives. |
| 1777-Drive Array External Drive Subsystem Error | None | Cooling fan failure, internal temperature alert, or open side panel | Inspect for cooling fan failure or open side panel. |

continued

Table 3-2
POST Error Messages *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Recommended Action |
|---|---------------|---|---|
| 1778-Drive Array resuming Automatic Data Recovery process | None | This error message displays whenever a controller reset or power cycle occurs while Automatic Data Recovery is in progress. | No action necessary. |
| 1779-Drive Array Controller detects replacement drives | None | Intermittent drive failure and/or possible loss of data | If this error message displays and drive <i>X</i> has not been replaced, this indicates an intermittent drive failure. This message also displays once immediately following drive replacement whenever data must be restored from backup. |
| 1780-Disk 0 Failure | None | Hard drive/format error | Run Diagnostics. Replace failed assembly as indicated. |
| 1781-Disk 1 Failure | None | Hard drive/format error | Run Diagnostics. Replace failed assembly as indicated. |
| 1782-Disk Controller Failure | None | Hard drive circuitry error | Run Diagnostics. Replace failed assembly as indicated. |
| 1783-Slot <i>x</i> Drive Array Controller Failure | None | ROM installation problem or array accelerator board problem. If this error message displays immediately following a ROM installation, the ROM is defective or not installed properly. | Check to see if: <ul style="list-style-type: none"> ■ The array accelerator board is attached properly. ■ The array controller is firmly inserted into its slot. If error recurs, upgrade the System ROMs. Otherwise, replace the Smart Array Controller. |
| 1784-Drive Array Drive Failure, Physical Drive | None | Defective drive and/or cables | Check for loose cables. Replace defective drive <i>X</i> and/or cable(s). |
| 1785-Drive Array not Configured | None | Configuration error | All of the following actions are related to error 1785 with specific descriptions: |
| Run Compaq Array Configuration Utility | None | Configuration error | Run the Array Configuration Utility. |
| No drives detected. | None | Configuration error | Power down system and check SCSI cable connections to make sure drives are attached properly. |
| Array Accelerator Memory Size Increased. | None | Configuration error | Run the System Configuration Utility. |

continued

Table 3-2
POST Error Messages *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Recommended Action |
|--|----------------------|-----------------------------------|--|
| 1785-External Cable(s) Attached to Wrong SCSI Port Connector(s). | None | Configuration error | Power down system and swap SCSI power connectors to prevent data loss. |
| Drive positions cannot be changed during Capacity Expansion. | None | Configuration error | Run Array Diagnostic Utility (ADU) if previous positions are unknown. Then power down system and move drives to their original positions. |
| Drive positions appear to have changed. | None | Configuration error | Run Array Diagnostic Utility (ADU) if previous positions are unknown. Then power down the system and move drives to their original positions. |
| Configuration information indicates drive positions beyond the capability of this controller. This may be due to drive movement from a controller that supports more drives than the current controller. | None | Configuration error | To avoid data loss, power down and reattach drives to the original controller. |
| Configuration information indicates drives were configured on a controller with a newer firmware version. | None | Configuration error | To avoid data loss, reattach drives to original controller or upgrade controller firmware to the version of the original controller using Option ROMPaq. Press F1 to resume. |

continued

Table 3-2
POST Error Messages *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Recommended Action |
|--|---------------|---|--|
| 1786-Drive Array Recovery Needed The following drive(s) need Automatic Data Recovery: Drive X. Select "F1" to continue with recovery of data to drive(s). Select "F2" to continue without recovery of data to drive(s). | None | Interim Data Recovery mode. Data has not been recovered yet. | Press F1 to allow Automatic Data Recovery to begin. Data is automatically restored to drive X when the drive is replaced or when existing drive is working. -Or- Press F2 to allow the system to continue operating in the Interim Data Recovery mode. |
| 1787-Drive Array Operating in Interim Recovery Mode. Physical drive replacement needed: Drive X | None | Hard drive X failed or cable is loose or defective. Following a system restart, this message reminds you that drive X is defective and fault tolerance is being used. | <ol style="list-style-type: none"> 1. Replace drive X as soon as possible. 2. Check loose cables. 3. Replace defective cables. |
| *1788-Incorrect Drive Replaced: Drive X Drive(s) were incorrectly replaced: Drive Y Select "F1" to continue – drive array will remain disabled. Select "F2" to reset configuration – all data will be lost. | None | The drives are disabled when they are not installed in their original positions. * | Reinstall the drives correctly as indicated. Press F1 to restart the computer with the drive array disabled. -Or- Press F2 to use the drives as configured and lose all the data on them. |
| <p>* The 1788 error message might display inadvertently due to a bad power cable connection to the drive or by noise on the data cable. If this message was due to a bad power cable connection, but not because of an incorrect drive replacement, repair the connection and press F2.</p> <p>-Or-</p> <p>If this message was not due to a bad power cable connection, and no drive replacement took place, this could indicate noise on the data cable. Check cable for proper routing.</p> | | | |

continued

Table 3-2
POST Error Messages *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Recommended Action |
|---|---------------|--|--|
| <p>1789-Drive Not Responding, Physical Drive</p> <p>Check cables or replace physical drive X.</p> <p>Select "F1" to continue – drive array will remain disabled.</p> <p>Select "F2" to fail drive(s) that are not responding.</p> <p>Interim Recovery Mode will be enabled if configured for fault tolerance.</p> | None | Cable or hard drive failure | <ol style="list-style-type: none"> 1. Check the cable connections. 2. Replace the cables. 3. Replace the drive. If you do not want to replace the drive now, press F2. |
| 1790-Disk 0 Configuration Error | None | Hard drive error or wrong drive type | Run the System Configuration Utility and Diagnostics and correct. |
| 1791-Disk 1 Error | None | Hard drive error or wrong drive type | Run the System Configuration Utility and Diagnostics and correct. |
| <p>1792-Drive Array Reports Valid Data Found in Array Accelerator.</p> <p>Data will automatically be written to drive array.</p> | None | Indicates that while the system was in use, power was interrupted while data was in the array accelerator memory. Power was then restored within 8 to 10 days, and the data in the array accelerator was flushed to the drive array. | No data has been lost. Perform orderly system shutdowns to avoid data remaining in the array accelerator. |
| <p>1793-Drive Array – Array Accelerator Battery Depleted – Data Lost</p> <p>(Error message 1794 also displays.)</p> | None | Indicates that while the system was in use, power was interrupted while data was in the array accelerator memory. Array accelerator batteries failed. Power was not restored within 8 to 10 days. Data in array accelerator has been lost. | Perform orderly system shutdowns to avoid data remaining in the array accelerator. |

continued

Table 3-2
POST Error Messages *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Recommended Action |
|--|----------------------|--|---|
| 1794-Drive Array – Array Accelerator Battery Charge Low. Array Accelerator is temporarily disabled. Array Accelerator will be re-enabled when battery reaches full charge. | None | A warning that the battery charge is below 75%. Posted-writes are disabled. | Replace the array accelerator board if batteries do not recharge while the system has been powered up for 36 hours. |
| 1795-Drive Array – Array Accelerator Configuration Error. Data does not correspond to this drive array. Array Accelerator is temporarily disabled. | None | Indicates that while the system was in use, power was interrupted while data was in the array accelerator memory. The data stored in the array accelerator does not correspond to this drive array. | Match the array accelerator to the correct drive array, or run the System Configuration Utility to clear the data in the array accelerator. |
| 1796-Drive Array – Array Accelerator Not Responding. Array Accelerator is temporarily disabled. | None | Array accelerator is defective or has been removed. | <ol style="list-style-type: none"> 1. Check that the array accelerator is properly seated. 2. Run the System Configuration Utility to reconfigure the Compaq IDA-2 without the array accelerator. |
| 1797-Drive Array – Array Accelerator Read Error Occurred. Data in Array Accelerator has been lost. Array Accelerator is disabled. | None | Hard parity error while reading data from posted-writes memory. | Enable array accelerator. |
| 1798-Drive Array – Array Accelerator Write Error Occurred. Array Accelerator is disabled. | None | Hard parity error while writing data to posted-writes memory. | Enable array accelerator. |

continued

Table 3-2
POST Error Messages *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Recommended Action |
|---|-----------------|--|--|
| 1799-Drive Array – Drive(s) Disabled due to Array Accelerator Data Loss. Select “F1” to continue with logical drives disabled. Select “F2” to accept data loss and to re-enable logical drives. | None | Volume failed due to loss of data in posted-writes memory. | Press F1 to continue with logical drives disabled or F2 to accept data loss and re-enable logical drive. |
| Beeps only | 2 long | No valid memory is present in the system. | Replace failed memory with valid memory. |
| Beeps only | 2 long, 2 short | Power is cycled. Temperature too hot. Processor fan not installed or spinning. | Check fans. |
| (Run System Configuration Utility – F10 key) | None | A configuration error occurred during POST. | Press F10 to run System Configuration Utility. |
| (RESUME – F1 key) | None | An indication to continue with the operation | Press F1 . |

Diagnostics Software

The Test Error Codes tables include all test error codes generated by Compaq products. Each code has a corresponding description and recommended action or actions. Each system generates only those codes that apply to its configuration and options.

When you select Diagnostics and Utilities from the System Configuration Utility main menu, the utility prompts you to test, inspect, upgrade, and diagnose the server.

Diagnostics and Utilities are located on the system partition on the hard drive and must be accessed when a system configuration error is detected during the Power-On Self-Test (POST). Diagnostics software is also available on the SmartStart and Support Software CD. You can create a Diagnostics diskette from the SmartStart and Support Software CD and run Diagnostics from diskette. See the “Running the Utilities from Diskette” procedure earlier in this chapter.

The following options are available from the Diagnostics and Utilities menu:

- Test Computer
- Inspect Computer
- Upgrade Firmware
- Remote Utilities
- Diagnose Drive Array

Diagnostic error codes are generated when the Diagnostics software recognizes a problem. These error codes help identify possible defective subassemblies.

Steps for Diagnostics

In each case, the Recommended Action column lists the steps necessary to correct the problem. After completing each step, run the Diagnostics utility to verify that the error condition has been corrected. If the error code is redisplayed:

1. Perform the next step listed in the table.
2. Run the Diagnostics utility program again.
3. Follow this procedure until the Diagnostics utility program no longer detects an error condition.

100 – 199, Primary Processor Test Error Codes

The 100 series of diagnostic error codes identifies failures with processor and system board functions. Corrective action may require replacing the system boards or processor assemblies.

Table 3-3
Primary Processor Test Error Codes

| Error Code | Description | Recommended Action |
|-------------------|---|---|
| 101-XX | CPU test failed. | Replace the processor board and retest. |
| 103-XX | DMA page registers test failed. | Replace the processor board and retest. |
| 104-XX | Interrupt controller master test failed. | |
| 105-XX | Port 61 error. | |
| 106-XX | Keyboard controller self-test failed. | |
| 107-XX | CMOS RAM test failed. | 1. Replace the battery/clock module and retest. |
| 108-XX | CMOS interrupt test failed. | 2. Replace the system board and retest. |
| 109-XX | CMOS clock load data test failed. | |
| 110-XX | Programmable timer load data test failed. | Replace the processor board and retest. |
| 111-XX | Refresh detect test failed. | |
| 112-XX | Speed test slow mode out of range. | |
| 113-XX | Protected mode test failed. | |
| 114-XX | Speaker test failed. | 1. Verify the speaker connection and retest. 2. Replace the speaker and retest. 3. Replace the system board and retest. |
| 116-XX | Cache test failed. | Replace the system board and retest. |
| 122-XX | Multiprocessor dispatch test failed. | 1. Check the system configuration and retest. 2. Replace the processor board and retest. |
| 123-XX | Interprocessor communication test failed. | 3. Replace the system board and retest. |
| 199-XX | Installed devices test failed. | 1. Check the system configuration and retest. 2. Verify cable connections and retest. 3. Check switch and/or jumper settings and retest. 4. Run the Configuration Utility and retest. 5. Replace the processor board and retest. 6. Replace the system board and retest. |

200 – 299, Memory Test Error Codes

The 200 series of diagnostic error codes identifies failures with the memory subsystem. Corrective action may require replacement of the memory expansion board, the memory modules, or the processor assembly.

Table 3-4
Memory Test Error Codes

| Error Code | Description | Recommended Action |
|-------------------|--|---|
| 200-XX | Invalid memory configuration. | Reinsert memory modules in correct location and retest. |
| 201-XX | Memory machine ID test failed. | 1. Replace the system ROM and retest. |
| 202-XX | Memory system ROM checksum failed. | 2. Replace the processor board and retest. 3. Replace the memory expansion board and retest. |
| 203-XX | Memory write/read test failed. | 1. Replace the memory module and retest. |
| 204-XX | Memory address test failed. | 2. Replace the processor board and retest. |
| 205-XX | Walking I/O test failed. | 3. Replace the memory expansion board and retest. |
| 206-XX | Increment pattern test failed. | |
| 207-XX | Invalid memory configuration—check DIMM installation. DIMMs installed have 8K refresh. | Replace DIMMs. |
| 208-XX | Invalid memory speed detected—check DIMM installation. Slow DIMMs may cause data loss. | Replace with DIMMs faster than 60 ns. |
| 210-XX | Random pattern test failed. | 1. Replace the memory module and retest. 2. Replace the processor board and retest. 3. Replace the memory expansion board and retest. |

300 – 399, Keyboard Test Error Codes

The 300 series of diagnostic error codes identifies failures with keyboard and system board functions. Correction action may require replacement of the keyboard or the system board assembly.

Table 3-5
Keyboard Test Error Codes

| Error Code | Description | Recommended Action |
|------------|---|---|
| 301-XX | Keyboard short test, 8042 self-test failed. | 1. Check the keyboard connection. If disconnected: power down the computer, reconnect the keyboard, power up the system, then retest. |
| 302-XX | Keyboard long test failed. | 2. Replace the keyboard and retest. |
| 303-XX | Keyboard LED test, 8042 self-test failed. | 3. Replace the system board and retest. |
| 304-XX | Keyboard typematic test failed. | |

400 – 499, Parallel Printer Test Error Codes

The 400 series of diagnostic error codes identifies failures with parallel printer interface board or system board functions. Corrective action may require replacement of the serial/parallel interface board or the system board assembly.

Table 3-6
Parallel Printer Test Error Codes

| Error Code | Description | Recommended Action |
|------------|----------------------------------|---|
| 401-XX | Printer failed or not connected. | 1. Connect the printer and retest. |
| 402-XX | Printer data register failed. | 2. Check the power to the printer and retest. |
| 403-XX | Printer pattern test failed. | 3. Install the loopback connector and retest. |
| 498-XX | Printer failed or not connected. | 4. Check the switch on the serial/parallel interface board (if applicable) and retest. 5. Replace the serial/parallel interface board (if applicable) and retest. 6. Replace the system board and retest. |

500 – 599, Graphics Display Unit Test Error Codes

The 500 series of diagnostic error codes identifies failures with graphics or system board functions. Corrective action may require replacement of the graphics board or the system board assembly.

Table 3-7
Graphics Display Unit Test Error Codes

| Error Code | Description | Recommended Action |
|-------------------|--|---|
| 501-XX | Graphics controller test failed. | 1. Replace the monitor and retest. |
| 502-XX | Graphics memory test failed. | 2. Replace the graphics board and retest. |
| 503-XX | Graphics attribute test failed. | 3. Replace the system board and retest. |
| 504-XX | Graphics character set test failed. | |
| 505-XX | Graphics 80x25-mode 9x14 character cell test failed. | |
| 506-XX | Graphics 80x25-mode 8x8 character cell test failed. | |
| 507-XX | Graphics 40x25-mode test failed. | |
| 508-XX | Graphics 320x200-mode color set 0 test failed. | |
| 509-XX | Graphics 320x200-mode color set 1 test failed. | |
| 510-XX | Graphics 640x200-mode test failed. | |
| 511-XX | Graphics screen memory page test failed. | |
| 512-XX | Graphics gray-scale test failed. | |
| 514-XX | Graphics white-screen test failed. | |
| 516-XX | Graphics noise pattern test failed. | |

600 – 699, Diskette Drive Test Error Codes

The 600 series of diagnostic error codes identifies failures with the diskette, diskette drive, or system board functions. Corrective action may require replacement of the diskette drive or the system board assembly.

Table 3-8
Diskette Drive Test Error Codes

| Error Code | Description | Recommended Action |
|-------------------|---|--|
| 600-XX | Diskette ID drive types test failed. | 1. Replace the diskette and retest. |
| 601-XX | Diskette format failed. | 2. Check and/or replace the diskette power and signal cables, then retest. |
| 602-XX | Diskette read test failed. | 3. Replace the diskette drive and retest. |
| 603-XX | Diskette write/read/compute test failed. | 4. Replace the system board and retest. |
| 604-XX | Diskette random seek test failed. | |
| 605-XX | Diskette ID media failed. | |
| 606-XX | Diskette speed test failed. | |
| 607-XX | Diskette wrap test failed. | |
| 608-XX | Diskette write protect test failed. | |
| 609-XX | Diskette reset controller test failed. | |
| 610-XX | Diskette change line test failed. | |
| 694-XX | Pin 34 is not cut on 360-KB diskette drive. | |
| 697-XX | Diskette type error. | |
| 698-XX | Diskette drive speed not within limits. | |
| 699-XX | Diskette drive/media ID error. | 1. Replace the media and retest. 2. Run the Configuration Utility and retest. |

1100 – 1199, Serial Test Error Codes

The 1100 series of diagnostic error codes identifies failures with serial/parallel interface board or system board functions. Corrective action may require replacement of the serial/parallel interface board or the system board assembly.

Table 3-9
Serial Test Error Codes

| Error Code | Description | Recommended Action |
|-------------------|-----------------------------|---|
| 1101-XX | Serial port test failed. | 1. Check the switch settings on the serial/parallel interface board (if applicable) and retest. |
| 1109-XX | Clock register test failed. | 2. Replace the serial/parallel interface board (if applicable) and retest. 3. Replace the system board and retest. |

1200 – 1299, Modem Communications Test Error Codes

The 1200 series of diagnostic error codes identifies failures with the modem. Corrective action may require replacement of the modem.

Table 3-10
Modem Communications Test Error Codes

| Error Code | Description | Recommended Action |
|-------------------|---|--|
| 1201-XX | Modem internal loopback test failed. | 1. Refer to the modem documentation for correct setup procedures and retest. |
| 1202-XX | Modem timeout test failed. | 2. Check the modem line and retest. |
| 1203-XX | Modem external termination test failed. | 3. Replace the modem and retest. |
| 1204-XX | Modem auto originate test failed. | |
| 1206-XX | Dial multifrequency tone test failed. | |
| 1210-XX | Modem direct connect test failed. | |

1700 – 1799, Hard Drive Test Error Codes

The 1700 series of diagnostic error codes identifies failures with hard drives, hard drive controller boards, hard drive cables, and system board functions. If the system uses a drive array controller, see “Array Diagnostic Utility (ADU)” later in this chapter.

Table 3-11
Hard Drive Test Error Codes

| Error Code | Description | Recommended Action |
|-------------------|--|--|
| 1700-XX | Hard drive ID drive types test failed. | 1. Run the System Configuration Utility and verify the drive type. |
| 1701-XX | Hard drive format test failed. | 2. Replace the hard drive signal and power cables, and retest. |
| 1702-XX | Hard drive read test failed. | 3. Replace the hard drive controller and retest. |
| 1703-XX | Hard drive write/read/compare test failed. | 4. Replace the hard drive and retest. |
| 1704-XX | Hard drive random seek test failed. | 5. Replace the system board and retest. |
| 1705-XX | Hard drive controller test failed. | |
| 1708-XX | Hard drive format bad track test failed. | |
| 1709-XX | Hard drive reset controller test failed. | |
| 1710-XX | Hard drive park head test failed. | |
| 1715-XX | Hard drive head select test failed. | |
| 1716-XX | Hard drive conditional format test failed. | |
| 1717-XX | Hard drive (ECC *) test failed. | |
| 1719-XX | Hard drive power mode test failed. | |
| 1736-XX | Drive monitoring failed. | |
| 1799-XX | Invalid hard drive type failed. | |

* Error checking and correcting

1900 – 1999, Tape Drive Test Error Codes

The 1900 series of diagnostic error codes identifies failures with tape cartridges, tape drives, tape drive cables, adapter boards, or the system board assembly.

Table 3-12
Tape Drive Test Error Codes

| Error Code | Description | Recommended Action |
|------------|--------------------------------------|--|
| 1900-XX | Tape ID failed. | 1. Replace the tape cartridge and retest. |
| 1901-XX | Tape servo write failed. | 2. Check and/or replace the signal cable and retest. |
| 1902-XX | Tape format failed. | 3. Check the switch settings on the adapter board (if applicable). |
| 1903-XX | Tape drive sensor test failed. | 4. Replace the tape adapter board (if applicable) and retest. |
| 1904-XX | Tape BOT/EOT test failed. | 5. Replace the tape drive and retest. |
| 1905-XX | Tape read test failed. | 6. Replace the system board and retest. |
| 1906-XX | Tape write/read/compare test failed. | |

6000 – 6099, Compaq Network Interface Controller Test Error Codes

The 6000 series of diagnostic error codes identifies failures with Compaq Network Interface Controller (NIC).

Table 3-13
Compaq Network Interface Controller Boards Test Error Codes

| Error Code | Description | Recommended Action |
|------------|--|---|
| 6000-XX | Network controller ID failed. | 1. Check the controller installation in the EISA slot. |
| 6001-XX | Network controller setup failed. | 2. Check the interrupt type and number setting. |
| 6002-XX | Network controller transmission failed. | 3. Check the media connection at the controller and Multistation Access Unit (MAU). |
| 6014-XX | Network controller configuration failed. | 4. Check the media speed (4/16) and type of Unshielded Twisted Pair/Shielded Twisted Pair (UTP/STP) settings. |
| 6016-XX | Network controller reset failed. | 5. Check the MAU, cables, or other network components. |
| 6028-XX | Network controller internal failed. | 6. Replace the controller. |
| 6029-XX | Network controller external failed. | |
| 6089-XX | Network controller open failed. | |
| 6090-XX | Network controller initialization failed. | |
| 6091-XX | Network controller internal loopback failed. | |
| 6092-XX | Network controller external loopback failed. | |

6500 – 6599, SCSI Hard Drive Test Error Codes

The 6500 series of diagnostic error codes identifies failures with SCSI hard drives, SCSI hard drive controller boards, SCSI hard drive cables, and system board functions. If the system uses a drive array controller, see “Array Diagnostic Utility ” later in this chapter.

Table 3-14
SCSI Hard Drive Test Error Codes

| Error Code | Description | Recommended Action |
|------------|---|--|
| 6500-XX | SCSI disk ID drive types test failed. | 1. Run the System Configuration Utility and verify the drive type. |
| 6502-XX | SCSI disk unconditional format test failed. | 2. Replace the SCSI disk drive signal and power cables, then retest. |
| 6505-XX | SCSI disk read test failed. | 3. Replace the SCSI controller and retest. |
| 6506-XX | SCSI disk SA/media test failed. | 4. Replace the SCSI disk drive and retest. |
| 6509-XX | SCSI disk erase tape test failed. | 5. Replace the system board and retest. |
| 6523-XX | SCSI disk random read test failed. | |
| 6528-XX | Media load/unload test failed. | |

6600 – 6699, SCSI/IDE CD-ROM Drive Test Error Codes

The 6600 series of diagnostic error codes identifies failures with the CD-ROM drive cables, CD-ROM drives, adapter boards, or the system board assembly.

Table 3-15
SCSI/IDE CD-ROM Drive Test Error Codes

| Error Code | Description | Recommended Action |
|------------|---------------------|--|
| 6600-XX | CD-ROM ID failed. | 1. Replace the CD-ROM media and retest. |
| 6605-XX | CD-ROM read failed. | 2. Check and/or replace the signal cable and retest. |
| | | 3. Check the switch settings on the adapter board (if applicable). |
| | | 4. Replace the SCSI controller (if applicable) and retest. |
| | | 5. Replace the CD-ROM drive and retest. |
| | | 6. Replace the system board and retest. |

6700 – 6799, SCSI Tape Drive Test Error Codes

The 6700 series of diagnostic error codes identifies failures with tape cartridges, tape drives, media changers, tape drive cables, adapter boards, or the system board assembly.

Table 3-16
SCSI Tape Drive Test Error Codes

| Error Code | Description | Recommended Action |
|------------|---------------------------------------|--|
| 6700-XX | SCSI tape ID drive types test failed. | 1. Run the System Configuration Utility and verify the drive type. |
| 6706-XX | SCSI disk SA/media test failed. | 2. Replace the SCSI tape drive signal and power cables, then retest. |
| 6709-XX | SCSI disk erase tape test failed. | 3. Replace the SCSI controller and retest. |
| 6728-XX | Media load/unload test failed. | 4. Replace the SCSI tape drive and retest. |
| | | 5. Replace the system board and retest. |

8600 – 8699, Pointing Device Interface Test Error Codes

The 8600 series of diagnostic error codes identifies failures with the pointing device (mouse, trackball, and so on) or the system board assembly.

Table 3-17
Pointing Device Interface Test Error Codes

| Error Code | Description | Recommended Action |
|------------|--|---|
| 8601-XX | Pointing device interface test failed. | 1. Replace with a working pointing device and retest. |
| | | 2. Replace the system board and retest. |

Array Diagnostic Utility

The Array Diagnostic Utility (ADU) is a Windows-based software tool designed to run on all Compaq servers that support Compaq array controllers and are configured with SmartStart 4.10 or later. The two main functions of ADU are to collect all possible information about array controllers in the system and to generate a list of detected problems. The error messages and codes listed include all codes generated by Compaq products. The system generates only codes applicable to the configuration and options in the server.

ADU works by issuing multiple commands to the array controllers to determine if a problem exists. This data can then be saved to a file. In severe situations, this file can be sent to Compaq for analysis. In most cases, ADU provides enough information to initiate problem resolution immediately.

NOTE: ADU does not write to the drives, destroy data, or change or remove configuration information.

To start ADU:

1. Insert the SmartStart CD into the CD-ROM drive.
2. Restart the system from the SmartStart CD.
3. Select Array Diagnostic Utility (ADU) from the System Utilities menu.

A “Please Wait” panel displays, indicating that the ADU is identifying the system parameters. ADU gathers information from all array controllers in the system. The time it takes to gather this information depends on the size of the system. When the information gathering process is complete, the ADU displays the main screen or a panel indicating any problems detected.



CAUTION: Do not cycle the power during this process. The ADU must perform low-level operations that, if interrupted, could cause the controller to revert to a previous level of firmware if the firmware was soft-upgraded.

4. To generate an ADU report, select File, and then select Save Data from the Command menu.

Table 3-18
Array Diagnostic Utility (ADU) Error Messages

| Message | Description | Recommended Action |
|--|---|--|
| Accelerator board not detected | Array controller did not detect a configured array accelerator board. | Install array accelerator board on array controller. If an array accelerator board is installed, check for proper seating on the array controller board. |
| Accelerator error log | List of the last 32 parity errors on transfers to or from memory on the array accelerator board. Displays starting memory address, transfer count, and operation (read and write). | If there are many parity errors, the array accelerator board may need to be replaced. |
| Accelerator parity read errors: X | Number of times that read memory parity errors were detected during transfers from memory on array accelerator board. | If there are many parity errors, the array accelerator board may need to be replaced. |
| Accelerator parity write errors: X | Number of times that write memory parity errors were detected during transfers to memory on the array accelerator board. | If there are many parity errors, the array accelerator board may need to be replaced. |
| Accelerator status: Cache was automatically configured during last controller reset | Can occur when cache board is replaced with one of a different size. | Normal operations should continue. |
| Accelerator status: Data in the cache was lost due to some reason other than the battery being discharged. | Data in cache was lost, but not because of the battery being discharged. | Check to be sure that the array accelerator is properly seated. If the error continues, the array accelerator may need to be replaced. |
| Accelerator status: Dirty data detected has reached limit. Cache still enabled, but writes no longer being posted. | The number of cache lines containing dirty data that cannot be flushed (written) to the drives has reached a preset limit. The cache is still enabled, but writes are no longer being posted. This problem usually occurs when there is a problem with the drive or drives. | Resolve the problem with the drive or drives, and then the controller can write the dirty data to the drives. Posted-writes operations are restored. |

continued

Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

| Message | Description | Recommended Action |
|--|---|--|
| Accelerator status: Dirty data detected. Unable to write dirty data to drives | At least one cache line contains dirty data that the controller has been unable to flush (write) to the drives. This problem usually occurs when there is a problem with the drive or drives. | Resolve the problem with the drive or drives, and then the controller can write the dirty data to the drives. |
| Accelerator status: Excessive ECC errors detected in at least one cache line. As a result, at least one cache line is no longer in use. | At least one line in the cache is no longer in use due to excessive error checking and correcting (ECC) errors detected during use of the memory associated with that cache line. | Consider replacing the cache. If cache replacement is not done, the remaining cache lines should continue to operate properly. |
| Accelerator status: Excessive ECC errors detected in multiple cache lines. As a result, the cache is no longer in use. | The number of cache lines experiencing excessive ECC errors has reached a preset limit. Therefore, the cache has been shut down. | Try reseating the cache to the controller. If not successful, replace the cache. |
| Accelerator status: Obsolete data detected | During reset initialization, obsolete data was found in the cache. This was due to the drives being moved and written to by another controller. | Normal operations should continue. The controller either writes the data to the drives or discards the data completely. |
| Accelerator status: Obsolete data was discarded | During reset initialization, obsolete data was found in the cache, and was discarded (not written to the drives). | Normal operations should continue. |
| Accelerator status: Obsolete data was flushed (written) to drives | During reset initialization, obsolete data was found in the cache. The obsolete data was written to the drives, but newer data may have been overwritten. | If newer data was overwritten, you may need to restore newer data; otherwise, normal operation should continue. |
| Accelerator status: Permanently disabled | Array accelerator board has been permanently disabled. It remains disabled until it is reinitialized using the Array Configuration Utility (ACU). | Check the Disable Code field. Run the ACU to reinitialize the array accelerator board. |
| Accelerator status: Possible data loss in cache | Possible data loss detected during power up due to all batteries being below sufficient voltage level and no presence of the identification signatures on the array accelerator board. | There is no way to determine if dirty or bad data was in the cache and is now lost. |
| Accelerator status: Temporarily disabled | Array accelerator board has been temporarily disabled. | Check the Disable Code field. |

continued

Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

| Message | Description | Recommended Action |
|---|--|---|
| Accelerator status: Unrecognized status | A status returned from the array accelerator board that ADU does not recognize. | Obtain the latest version of ADU. |
| Accelerator status: Valid data found at reset | Valid data was found in posted-write memory at reinitialization. Data is flushed to disk. | Not an error or data loss condition. No action needs to be taken. |
| Accelerator status: Warranty alert | Catastrophic problem with array accelerator board. Refer to other messages on Diagnostics screen for exact meaning of this message. | Replace the array accelerator board. |
| Adapter/NVRAM ID mismatch | EISA nonvolatile RAM has an ID for a different controller from the one physically present in the slot. | Run the server setup utility. |
| Array accelerator battery pack X not fully charged | Battery is not fully charged. | If 75% of the batteries present are fully charged, the array accelerator is fully operational. If more than 75% of the batteries are not fully charged, allow 36 hours to recharge them. |
| Array accelerator battery pack X below reference voltage (recharging) | Battery pack on the array accelerator is below the required voltage levels. | Allow enough time for batteries to recharge (36 hours). If batteries have not recharged after 36 hours, replace the array accelerator board. |
| Board in use by expand operation | Array accelerator memory is in use by an expand operation. | Operate the system without the array accelerator board until the expand operation completes. |
| Board not attached | An array controller is configured for use with array accelerator board, but one is not attached. | Attach array accelerator board to array controller. |
| Configuration signature is zero | ADU detected that nonvolatile RAM contains a configuration signature of zero. Old versions of the server setup utility could cause this. | Run the latest version of server setup utility to configure the controller and nonvolatile RAM. |
| Configuration signature mismatch | Array accelerator board configured for a different array controller board. Configuration signature on array accelerator board does not match the one stored on the array controller board. | To recognize the array accelerator board, run the Array Configuration Utility. |
| Controller communication failure occurred | Controller communication failure occurred. | ADU was unable to successfully issue commands to the controller in this slot. |
| Controller detected. NVRAM configuration not present | EISA nonvolatile RAM does not contain a configuration for this controller. | Run the server setup utility to configure the nonvolatile RAM. |

continued

Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

| Message | Description | Recommended Action |
|---|---|--|
| Controller firmware needs upgrading | Controller firmware is below the latest recommended version. | Run Options ROMPaq Utility to upgrade the controller to the latest firmware revision. |
| Controller is located in special "video" slot | Controller is installed in slot for special video control signals. If controller is used in this slot, LED indicators on front panel may not function properly. | Install the controller in a different slot, and run the server setup utility to configure nonvolatile RAM. Then run Array Configuration Utility to configure the controller. |
| Controller is not configured | Controller is not configured. If controller was previously configured and you change drive locations, there may be a problem with placement of the drives. ADU examines each physical drive and looks for drives that have been moved to a different drive bay. | Look for messages indicating which drives have been moved. If none display and drive swapping did not occur, run the Array Configuration Utility to configure the controller and server setup utility to configure nonvolatile RAM. Do not run either utility if you believe drive swapping has occurred. |
| Controller reported POST error Error Code: X | The controller returned an error from its internal Power-On Self-Test (POST). | Replace the controller. |
| Controller restarted with a signature of zero | ADU did not find a valid configuration signature to use to get the data. Nonvolatile RAM may not be present (unconfigured) or the signature present in nonvolatile RAM may not match the signature on the controller. | Run the server setup utility to configure the controller and nonvolatile RAM. |
| Disable command issued | The issuing of the Accelerator Disable command has disabled posted-writes. This occurred because of an operating system device driver. | Restart the system. Run the Array Configuration Utility to reinitialize the array accelerator board. |
| Drive (bay) X firmware needs upgrading | Firmware on this physical drive is below the latest recommended version. | Run the Options ROMPaq Utility to upgrade the drive firmware to the latest revision. |
| Drive (bay) X has insufficient capacity for its configuration | Drive has insufficient capacity to be used in this logical drive configuration. | Replace this drive with a larger capacity drive. |
| Drive (bay) X has invalid M&P stamp | Physical drive has invalid monitor and performance data. | Run the server setup utility to properly initialize this drive. |
| Drive (bay) X has loose cable | The array controller could not communicate with this drive at power up. This drive has not previously failed. | Check all cable connections first. The cables could be bad, loose, or disconnected. Power up the system and attempt to reconnect data/power cable to the drive. If this does not work, replace the cable. If it is still unsuccessful, the drive may need to be replaced. |
| Drive (bay) X is a replacement drive | This drive has been replaced. This message displays if a drive is replaced in a fault tolerant logical volume. | If the replacement was intentional, allow the drive to rebuild. |

continued

Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

| Message | Description | Recommended Action |
|--|---|---|
| Drive (bay) <i>X</i> is a replacement drive marked OK | This drive has been replaced and marked OK by the firmware. This may occur if a drive has an intermittent failure. For example, a drive has previously failed, then starts working again when ADU is run. | Replace the drive. |
| Drive (bay) <i>X</i> is failed. | The indicated physical drive has failed. | Replace the drive. |
| Drive (bay) <i>X</i> is undergoing drive recovery | This drive is being rebuilt from the corresponding mirror or parity data. | Normal operations should occur. |
| Drive (bay) <i>X</i> needs replacing | The 210-MB hard drive has firmware version 2.30 or 2.31. | Replace the drive. |
| Drive (bay) <i>X</i> upload code not readable | An error occurred while ADU was trying to read the upload code information from this drive. | If there were multiple errors, the drive may need to be replaced. |
| Drive (bay) <i>X</i> was inadvertently replaced | The physical drive was incorrectly replaced after another drive failed. | <ol style="list-style-type: none"> 1. Replace the drive that was incorrectly replaced. 2. Replace the original drive that failed. Do not run the server setup utility and try to reconfigure. |
| Drive Monitoring features are unobtainable | ADU is unable to receive monitor and performance data due to fatal command problem (such as drive time-out), or unable to receive data due to these features not being supported on the controller. | Check for other errors such as time-outs. If no other errors occur, upgrade the firmware to a version that supports the monitor and performance. |
| Drive Monitoring is NOT enabled for SCSI Port <i>X</i> Drive ID <i>Y</i> | The monitor and performance features have not been enabled on this drive. | Run the server setup utility to initialize the monitor and performance features. |
| Drive time-out occurred on physical drive bay <i>X</i> | ADU issued a command to a physical drive and the command was never acknowledged. | The drive or cable may be bad. Check the other error messages on the Diagnostics screen to determine resolution. |
| Drive <i>X</i> indicates position <i>Y</i> | Message indicates a designated physical drive, which shows it to be scrambled or in a drive bay other than the one for which it was originally configured. | Examine the graphical drive representation on ADU to determine proper drive locations. Remove drive <i>X</i> and place it in drive position <i>Y</i> . Rearrange the drives according to the ADU instructions. |

continued

Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

| Message | Description | Recommended Action |
|---|---|---|
| Duplicate write memory error | Data could not be written to the array accelerator board in duplicate due to the detection of parity errors. This is not a data loss situation. | Replace the array accelerator board. |
| Error occurred reading RIS copy from SCSI Port X Drive ID | An error occurred while ADU was trying to read the reserve information sector (RIS) from this drive. | Compaq stores the hard drive configuration information in the reserve information sector. If there were multiple errors, the drive may need to be replaced. |
| FYI: Drive (bay) X is non-Compaq supplied | Compaq did not supply the installed drive. | If problems exist with this drive, replace it with a Compaq drive. |
| Identify controller data did not match with NVRAM | The controller identification data from the array controller did not match with the information stored in nonvolatile RAM. This could occur if new, previously configured drives have been placed in a system that has also been previously configured. It could also occur if the firmware on the controller has been upgraded and the server setup utility was not run. | Run the INSPECT Utility to check the controller identification data. If the firmware version field is the only difference between the controller and nonvolatile RAM data, this is not a problem. Otherwise run the server setup utility. |
| Identify logical drive data did not match with NVRAM | The identify unit data from the array controller did not match with the information stored in nonvolatile RAM (NVRAM). This could occur if new, previously configured drives have been placed in a system that has also been previously configured. | Run the server setup utility to configure the controller and nonvolatile RAM. |
| Insufficient adapter resources | The adapter does not have sufficient resources to perform posted-write operations to the array accelerator board. Drive rebuild may be occurring. | Operate the system without the array accelerator board until the drive rebuild completes. |
| Inter-controller link connection could not be established | Unable to communicate over the link connecting the redundant controllers. | Make sure both controllers are using the same hardware and firmware revisions. If one controller failed, replace it. |
| Less than 75% batteries at sufficient voltage | The operation of the array accelerator board has been disabled due to less than 75% of the battery packs being at the sufficient voltage level. | Allow sufficient time for the batteries to recharge (36 hours). If the batteries have not recharged after 36 hours, replace the array accelerator board. |
| Less than 75% of batteries at sufficient voltage Battery pack X below reference voltage | Battery pack on the array accelerator is below the required voltage levels. | Allow enough time for batteries to recharge (36 hours). If batteries have not recharged after 36 hours, replace the array accelerator board. |

continued

Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

| Message | Description | Recommended Action |
|--|---|--|
| Logical drive <i>X</i> failed due to cache error | This logical drive failed due to a catastrophic cache error. | Replace the array accelerator board and reconfigure using the Array Configuration Utility. |
| Logical Drive <i>X</i> status = Failed | This status could be issued for several reasons: <ul style="list-style-type: none"> ■ Logical drive is configured for No Fault Tolerance and one or more drives fail. ■ Mirroring is enabled, and any two mirrored drives fail. ■ Data Guarding is enabled, and two or more drives fail. ■ Another configured logical drive is in the WRONG DRIVE REPLACED or LOOSE CABLE DETECTED state. | Check for drive failures, wrong drive replaced, or loose cable messages. If there was a drive failure, replace the failed drive or drives, and then restore the data for this logical drive from the tape backup. Otherwise, follow the procedures for correcting problems when an incorrect drive is replaced or a loose cable is detected. |
| Logical Drive <i>X</i> status = Interim recovery (volume functional, but not fault tolerant) | A physical drive in this logical drive has failed. The logical drive is operational, but the loss of an additional drive causes permanent data loss. | Replace the failed drive as soon as possible. |
| Logical Drive <i>X</i> status = loose cable detected | A physical drive or an external storage unit may have a cable or connection problem. | Power down the system and attempt to reattach any loose connections. If this does not work, replace the cable(s) and connection(s). |
| | SOLUTION: Turn the system off and attempt to reattach any loose connections. If this does not work, replace the cable(s) and connection(s). | |
| Logical Drive <i>X</i> status = Overheated | The temperature of the Intelligent Array Expansion System drive is beyond safe operating levels and has shut down to avoid damage. | Check the fans and the operating environment. |
| Logical Drive <i>X</i> status = Overheating | The temperature of the Intelligent Array Expansion System drive is beyond safe operating levels. | Check the fans and the operating environment. |
| Logical Drive <i>X</i> status = Recovering (rebuilding data on a replaced drive) | A physical drive in this logical drive has failed and has now been replaced. The replaced drive is rebuilding from the mirror drive or the parity data. | Nothing needs to be done. Although normal operations can resume, performance is less than optimal until the rebuild process is complete. |

continued

Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

| Message | Description | Recommended Action |
|--|---|--|
| Logical Drive X status = Wrong drive replaced | A physical drive in this logical drive has failed. The incorrect drive was replaced. | Replace the drive that was incorrectly replaced. Then, replace the original drive that failed with a new drive. Do not run the server setup utility to reconfigure; you will lose data on the drive. |
| Loose cable detected—logical drives may be marked FAILED until corrected | ADU found a loose cable. The Smart Array Controller is unable to communicate with one or more physical drives. One or more logical drives may be marked FAILED, and are unusable until problem is corrected. | Power down the system. Check the cables for tight connection to the logical drives. Restart the system. If the same message occurs again, cables may be bad. |
| Loose cable detected—logical drives may be marked FAILED until corrected | Controller is unable to communicate with one or more physical drives, probably because of a cabling problem. Logical drives may be in a FAILED state until the condition is corrected, preventing access to data on the controller. | Check all controller and drive cable connections. |
| Mirror data miscompare | Data was found at reset initialization in the posted-write memory; however, the mirror data compare test failed resulting in that data being marked as invalid. Data loss is possible. | Replace the array accelerator board. |
| No configuration for array accelerator board | The array accelerator board has not been configured. | If the array accelerator board is present, run the Array Configuration Utility (ACU) to configure the board. |
| NVRAM configuration present, controller not detected | EISA nonvolatile RAM has a configuration for an array controller, but there is no board in this slot. Either a board has been removed from the system or a board has been placed in the wrong slot. | Place the array controller in the proper slot, or run the server setup utility to reconfigure nonvolatile RAM to reflect the removal or new position. |
| One or more drives is unable to support redundant controller operation | At least one drive in use does not support redundant controller operation. | Replace the drive that does not support redundant controller operation. |
| Other controller indicates different hardware model | The other controller in the redundant controller configuration is a different hardware model. | Make sure both controllers are using the same hardware model. If they are, make sure controllers are fully seated in their slots. |
| Other controller indicates different firmware version | The other controller in the redundant controller configuration is using a different firmware version. | Make sure both controllers are using the same firmware revision. |

continued

Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

| Message | Description | Recommended Action |
|--|--|--|
| Other controller indicates different cache size | The other controller in the redundant controller configuration has a different size array accelerator. | Make sure both controllers are using the same capacity array accelerator. |
| RIS copies between drives do not match | The drives on this controller contain copies of the RIS that do not match. | The hard drives in the array do not have matching configuration information. To remedy: <ol style="list-style-type: none"> 1. Resolve all other errors encountered. 2. Obtain the latest version of ADU, and then rerun ADU. 3. If unconfigured drives were added, configure these drives using the Array Configuration Utility (ACU). Once these drives are configured, the error should be resolved. 4. If drives or arrays were moved, make sure the movement adheres to the guidelines listed in the documentation for the array controller. 5. If the error persists after completing steps 1-4, contact a Compaq authorized service provider. |
| SCSI port X Drive ID Y failed – REPLACE (<i>failure message</i>) | ADU detected a drive failure. | Correct the condition that caused the error, if possible, or replace the drive. |
| SCSI port X, Drive ID Y firmware needs upgrading | Firmware for the drive may cause problems and should be upgraded. | Run Options ROMPaq Utility to upgrade the drive's firmware to a later revision. |
| SCSI port X, Drive ID Y has exceeded threshold(s) | The monitor and performance threshold for this drive has been violated. | Verify and resolve the threshold that has been violated. |

continued

Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

| Message | Description | Recommended Action |
|--|---|--|
| SCSI port <i>X</i> , Drive ID <i>Y</i> is not stamped for monitoring | The drive has not been stamped with Monitor and Performance features. | To change without destroying the current configuration: <ol style="list-style-type: none"> 1. Run the Array Configuration Utility (ACU). 2. Change the array accelerator size and save the configuration. 3. Change the array accelerator back to the original size and save again. <p>This should cause ACU to stamp the drive with monitoring and performance features.</p> |
| SCSI port <i>X</i> , Drive ID <i>Y</i> may have a loose connection SOLUTION: Turn the system off and attempt to reattach any loose connections. If this does not work, replace the cable(s) and connection(s). | SMART is unable to communicate with the drive, because the cable is not securely connected, or the drive cage connection has failed. | <ol style="list-style-type: none"> 1. Power down the system. 2. Reconnect the cable securely. 3. Restart the system. 4. If this does not solve the problem, replace the cables and connectors as needed. |
| SCSI port <i>X</i> , Drive ID <i>Y</i> RIS copies within this drive do not match | The copies of RIS on the drive do not match. | Check for other errors. The drive may need to be replaced. |
| SCSI port <i>X</i> , Drive ID <i>Y</i> ...S.M.A.R.T. predictive failure errors have been detected in the factory Monitor and Performance data. SOLUTION: Please replace this drive when conditions permit. | A predictive failure warning for this hard drive has been generated indicating a drive failure is imminent. | Replace this drive at the earliest opportunity. See "Hot-Plug Hard Drives" in Chapter 2 prior to performing this operation. |

continued

Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

| Message | Description | Recommended Action |
|--|--|--|
| SCSI port X, Drive ID Y...S.M.A.R.T. predictive failure errors Have been detected in the power Monitor and Performance data. SOLUTION: Please replace this drive when conditions permit. | A predictive failure warning for this hard drive generates and indicates a drive failure is imminent. | Replace this drive at the earliest opportunity. See "Hot-Plug Hard Drives" in Chapter 2 prior to performing this operation. |
| SCSI port X, Drive ID Y was replaced on a good volume: (failure message) | ADU found this drive was replaced, although there was no problem with the volume. | No action needs to be taken. |
| Set configuration command issued | The configuration of the array controller has been updated. The array accelerator board may remain disabled until it is reinitialized. | Run the server setup utility to reinitialize the array accelerator board. |
| Soft Firmware Upgrade required | ADU has determined that your controller is running firmware that has been soft-upgraded by the Compaq Upgrade Utility. However, the firmware running is not present on all drives. This could be caused by the addition of new drives in the system. | Run the Compaq Upgrade Utility to place the latest firmware on all drives. |

continued

Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

| Message | Description | Recommended Action |
|--|---|---|
| Storage enclosure on SCSI bus <i>X</i> has a cabling error (bus disabled). SOLUTION: The SCSI controller has an internal and external cable attached to the same bus. Please disconnect the internal or external cable from the controller. If this controller supports multiple buses, the cable disconnected can be reattached to an available bus. | The current cable configuration is not supported. | Refer to your user documentation for cable guidelines and reconfigure as indicated. |
| Storage enclosure on SCSI bus <i>X</i> indicated a door alert. SOLUTION: Be sure that the storage enclosure door is closed or the side panel is properly installed. | The side panel of the external storage unit is open. | Make sure the side panel of the storage unit is securely closed. |
| Storage enclosure on SCSI bus <i>X</i> indicated a power supply failure. SOLUTION: Replace the power supply. | A power supply in the external storage unit has failed. | Replace the power supply. |

continued

Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

| Message | Description | Recommended Action |
|---|---|--|
| Storage enclosure on SCSI bus <i>X</i> indicated an overheated condition. SOLUTION: Make sure all cooling fans are operating properly. Also be sure the operating environment of storage enclosure is within temperature specifications. | The external storage unit is generating a temperature alert. | <ol style="list-style-type: none"> 1. Verify that all fans are attached and operating properly. 2. Make sure the operating environment of the storage unit is within specifications. 3. For better airflow, remove any dust buildup from fans or other areas. 4. Check your user documentation for allowable temperature specifications and additional tips. 5. If none of the above actions solve this problem, replace the fan. |
| Storage enclosure on SCSI bus <i>X</i> is unsupported with its current firmware version. SOLUTION: Upgrade the firmware version on the storage enclosure. | The firmware version of the external storage unit is not supported. | Upgrade the firmware. |
| Storage enclosure on SCSI bus <i>X</i> indicated that the fan failed. SOLUTION: Replace the fan. | The cooling fan located in the external storage unit has experienced a failure. | Replace the fan. |
| Storage enclosure on SCSI bus <i>X</i> indicated that the fan is degraded. SOLUTION: This condition usually occurs on enclosures with multiple fans and one of those fans has failed. Replace any fans not operating properly. | One or more fans in the external storage unit have failed. | Replace the failed fans. |

continued

Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

| Message | Description | Recommended Action |
|--|--|---|
| Storage enclosure on SCSI bus X indicated that the fan module is unplugged. SOLUTION: Make sure the fan module is properly connected. | A fan in the external storage unit is not connected properly. | Check and reseal all fan connections securely. |
| Storage enclosure on SCSI bus X – Wide SCSI transfer failed. SOLUTION: This may indicate a bad SCSI cable on bus X. Try replacing the cable. | A cable on bus X has failed. | <ol style="list-style-type: none"> 1. Replace the failed cable. 2. If that does not solve the problem, contact your Compaq authorized service provider. |
| Swapped cables or Configuration error detected. A configured array of drives was moved from another controller that supported more drives than this controller supports. SOLUTION: Upgrade the firmware on this controller. If this doesn't solve the problem, then power down system and move the drives back to the original controller. | You have exceeded the maximum number of drives supported for this controller and the attached controller was not part of the original array configuration. | <ol style="list-style-type: none"> 1. Upgrade the firmware on this controller. 2. If the problem is not resolved: Replace this controller with the original controller. -Or- Replace this controller with a new controller that supports the number of drives in the array. |

continued

Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

| Message | Description | Recommended Action |
|--|--|---|
| <p>Swapped cables or Configuration error detected.</p> <p>A drive rearrangement was attempted while an expand operation was running. This is an unsupported operation.</p> <p>SOLUTION: Power down system then move drives back to their original location. Power on system and wait for the expand operation to complete before attempting a drive rearrangement.</p> | <p>One or more drive locations were changed while an expand operation was in progress.</p> | <ol style="list-style-type: none"> 1. Power down the server. 2. Place the drives back in their original locations. 3. Restart the server, and complete the expand operation. 4. Move the drives to their new locations after the expand operation is completed. |
| <p>Swapped cables or Configuration error detected.</p> <p>An unsupported drive arrangement was attempted.</p> <p>SOLUTION: Power down system then move drives back to their original location.</p> | <p>One or more physical drives were moved, causing a configuration that is not supported.</p> | <p>Move all drives back to their original locations, and refer to your user documentation for supported configurations.</p> |
| <p>Swapped cables or Configuration error detected.</p> <p>The cables appear to be interchanged.</p> <p>SOLUTION: Power down system then move the drives or cables back to their original location.</p> | <p>ADU has detected a change in the cable configuration.</p> <p>One or more cables may be attached to the incorrect bus.</p> <p>-Or-</p> <p>One or more drives have been moved to new locations.</p> | <p>Refer to your user documentation for supported configurations and cabling guidelines.</p> <p>Restore to the original configuration.</p> |

continued

Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

| Message | Description | Recommended Action |
|---|--|---|
| <p>Swapped cables or Configuration error detected.</p> <p>The configuration information on the attached drives is not backward compatible with this controller's firmware.</p> <p>SOLUTION: Upgrade the firmware on this controller. If this doesn't solve the problem then power down system then move drives back to the original controller.</p> | <p>The current firmware version on the controller cannot interpret the configuration information on the attached drives.</p> | <p>Upgrade the firmware.</p> <p>-Or-</p> <p>If that does not solve the problem, move the drives back to the original controller.</p> |
| <p>Swapped cables or Configuration error detected.</p> <p>The maximum logical volume count X was exceeded during logical volume addition. All logical volumes beyond X have been lost and cannot be recovered.</p> <p>SOLUTION: Identify the drives that contain the lost logical volumes. Move those drives to another controller where the logical volumes can be recreated. NOTE! If a drive contains a valid logical volume and a lost logical volume, then do not move that drive to another controller.</p> | <p>More logical drives were created than are supported on this controller, causing lost logical drive volumes.</p> | <p>Identify the drives containing lost volumes, and move them to another controller so the lost volumes can be recreated.</p> <p>WARNING: Do not move a drive if it also contains valid volume data. This process causes all valid data to be destroyed!</p> |

continued

Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

| Message | Description | Recommended Action |
|--|---|--|
| System board is unable to identify which slots the controllers are in | Slot indicator on system board is not working correctly. Firmware recognizes both controllers as being installed in the same slot. | <ol style="list-style-type: none"> 1. Make sure both controllers are fully seated in their slots. If the problem persists, this might indicate a controller problem or a system board problem. 2. Remove one of the controllers in the configuration and see if the remaining controller generates a Power-On Self-Test (POST) message. 3. Move the remaining controller to the other slot to see if it still generates a POST message. 4. Repeat these steps with the other controller. <p>If both controllers give POST messages in one slot but not the other, it is a system board problem. If one of the controllers gives POST messages and the other controller does not, replace the controller that is giving the POST messages. Contact a Compaq authorized service provider for any warranty replacements.</p> |
| The redundant controllers installed are not the same model. SOLUTION: Power down the system and verify that the redundant controllers are different models. If they are different models, replace the other controller with the same model as this one. | ADU detected two different controller models installed in a redundant controller configuration. This is not supported, and one or both controllers may not be operating properly. | Use the same controller models for redundant controller configurations. |
| This controller cannot see the drives but the other controller can | The other controller in the redundant controller configuration can recognize the drives, but this controller cannot. | Resolve any other errors and then rerun ADU. |
| This controller can see the drives but the other controller cannot | The other controller in the redundant controller configuration cannot recognize the drives, but this controller can. | Resolve any other errors and then rerun ADU. |
| Unable to communicate with drive on SCSI Port X, Drive ID Y | The array controller cannot communicate with the drive. | If the hard drive amber LED is on, replace the drive. |

continued

Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

| Message | Description | Recommended Action |
|--|--|---|
| Unable to retrieve identify controller data. Controller may be disabled or failed. SOLUTION: Power down the system. Verify that the controller is fully seated. Then power the system on and look for helpful error messages displayed by the controller. If this doesn't help, contact your COMPAQ service provider. | ADU requested the identify controller data from the controller but was unable to obtain it. This usually indicates that the controller is not seated properly or has failed. | <ol style="list-style-type: none"> 1. Power down the server. 2. Verify the controller is fully seated. 3. Restart the server. 4. Resolve any error messages displayed by the controller. <p>If this does not solve the problem, contact a Compaq authorized service provider.</p> |
| Unknown disable code | A code was returned from the array accelerator board that ADU does not recognize. | Obtain the latest version of ADU. |
| Unrecoverable read error | Read parity errors were detected when attempting to read the same data from both sides of the mirrored memory. Data loss occurs. | Replace the array accelerator board. |
| Warning bit detected | A monitor and performance threshold violation may have occurred. The status of a logical drive may not be OK. | Check the other error messages for an indication of the problem. |
| WARNING – Drive Write Cache is enabled on X | Drive has its internal write cache enabled. The drive may be a third-party drive or the operating parameters of the drive may have been altered. Condition may cause data corruption if power to the drive is interrupted. | Replace the drive with a Compaq drive, or restore the operating parameter of the drive. |

continued

Table 3-18
Array Diagnostic Utility (ADU) Error Messages *continued*

| Message | Description | Recommended Action |
|---|--|--|
| <p>WARNING: Storage enclosure on SCSI bus <i>X</i> indicated it is operating in single ended mode.</p> <p>SOLUTION: This usually occurs when a single ended drive type is inserted into an enclosure with other drive types; and that makes the entire enclosure operate in single ended mode. To maximize performance replace the single ended mode drive with a type that matches the other drives.</p> | <p>One or more single-ended mode SCSI drives are installed in an external storage unit that operates in low voltage differential (LVD) mode.</p> | <p>The array is operational, but installing all LVD drives maximizes performance.</p> |
| <p>Write memory error</p> | <p>Data could not be written to the cache memory. This typically means that a parity error was detected while writing data to the cache. This could be caused by an incomplete connection between the cache and the controller. This is not a data loss circumstance.</p> | <p>With system powered down, verify that the cache board is fully connected to the controller.</p> |
| <p>Wrong Accelerator</p> | <p>This could mean that the board was replaced in the wrong slot or was placed in a system previously configured with another board type. Included with this message is a message indicating (1) the type of adapter sensed by ADU, and (2) the type of adapter last configured in EISA nonvolatile RAM.</p> | <p>Check the diagnosis screen for other error messages. Run the server setup utility to update the system configuration.</p> |

Integrated Management Log

The Compaq Integrated Management Log (IML) replaces the Critical Error Log and Correctable Memory Logs. IML records system events and stores them in an easily viewable form. Each event is marked with a time-stamp with one-minute granularity.

Events listed in the IML are categorized as one of four event severity levels:

- **Status**—indicates that the message is informational only.
- **Repaired**—indicates that corrective action has been taken.
- **Caution**—indicates a nonfatal error condition.
- **Critical**—indicates a component failure.

The IML requires Compaq operating system-dependent drivers. Refer to the Support Software CD for instructions on installing the appropriate drivers.

Multiple Ways of Viewing the IML

You can view an event in the IML from within the:

- Compaq Insight Manager
- Compaq Survey Utility
- IML Management Utility

Compaq Insight Manager

Compaq Insight Manager is a comprehensive management tool used to monitor and control the operation of Compaq servers and clients. Compaq Insight Manager consists of two components: a Windows-based console application, and server- or client-based management data collection agents. Starting with Compaq Insight Manager 4.0, the agents for Microsoft Windows NT and Novell NetWare are also Web-enhanced; that is, these agents enable Web browser access and monitoring of management information.

The management agents monitor over 1,000 management parameters. Key subsystems are instrumented to make health, configuration, and performance data available to agent software. Agents act upon data by initiating information, such as statistics on network interface or storage subsystem performance.

Viewing the Event List

1. From Compaq Insight Manager, select the appropriate server, and then select View Device Data. The selected server displays, with buttons around its perimeter.
2. Select the Recovery button, and then select the Integrated Management Log.
3. If a failed component has been replaced, select the event from the list. Then select Mark Repaired for the failed component in the Insight Manager.

Printing the Event List

NOTE: You can only view the event list from the Recovery/Integrated Management Log screen as described above.

1. From the Compaq Insight Manager screen, select the appropriate server.
2. Select the Configuration button, then the Recovery button, and then Print.

Compaq Survey Utility

The Compaq Survey Utility is a serviceability tool available for Windows NT and NetWare. It delivers online-configuration capture and comparison to maximize server availability. It is delivered on the Compaq Management CD in the SmartStart package or is available on the Compaq website. Refer to the Compaq Management CD for information on installing and running the Compaq Survey Utility.

After running the Compaq Survey Utility, view the IML by loading the output of the utility (typically called "survey.txt") into a text viewer such as Microsoft Notepad. The event list follows the system slot information. After opening the text file, print it using the print feature of the viewer.

Compaq IML Management Utility

The Compaq IML Management Utility is a DOS-based tool that gives you the offline ability to review, mark corrected, and print events from the IML. It is located on the SmartStart and Support Software CD. Refer to the SmartStart Installation for Servers poster, which ships with the server, for information on how to install and use the IML Management Utility.

OS IML Viewer

Windows NT and NetWare have OS-specific IML viewers that allow you to view the IML while the server is running and while you are at the server console.

Event List

The Event List displays the affected components and the associated error messages. Though the same basic information displays, the format of the list may differ, depending on how you view it.

Event Messages

Table 3-19
Event Messages

| Event Type | Event Message | Recommended Action |
|---|--|---|
| Machine Environment | | |
| Fan Failure | System Fan Failure (Fan X, Location) | Replace fan. |
| Fan Inserted | System Fan Inserted (Fan X, Location) | None |
| Fan Removed | System Fan Removed (Fan X, Location) | None |
| Fans Not Redundant | System Fans Not Redundant | Add fan. |
| Overheat Condition | System Overheating (Zone X, Location) | Check fans. |
| Main Memory | | |
| Correctable Error threshold exceeded | Corrected Memory Error threshold passed (Slot X, Memory Module X) | Replace the defective memory module. |
| | Corrected Memory Error threshold passed (System Memory) | Replace memory modules one at a time (if more than one) and retest the system after each replacement. |
| | Corrected Memory Error threshold passed (Memory Module unknown) | Replace the memory modules one at a time (if more than one). |
| Uncorrectable Error | Uncorrectable Memory Error (Slot X, Memory Module X) | Replace the defective memory module. |
| | Uncorrectable Memory Error (System Memory) | Replace the defective memory module. |
| | Uncorrectable Memory Error (Memory Module unknown) | Replace memory modules one at a time (if more than one) and retest the system after each replacement. |

continued

Table 3-19
Event Messages *continued*

| Event Type | Event Message | Recommended Action |
|--------------------------------------|---|--|
| Processor | | |
| Correctable Error Threshold exceeded | Processor Correctable Error Threshold passed (Slot X, Socket X) | Replace the processor. |
| Uncorrectable Error | Unrecoverable Host Bus Data Parity Error | Replace the processor. |
| Host Bus Error | Unrecoverable Host Bus Address Parity Error | Call the Compaq authorized service provider or Compaq technical support for diagnosis. |
| PCI Bus Error | PCI Bus Error (Slot X, Bus X, Device X, Function X) | Power down PCI slot and replace board. |
| Power Subsystem | | |
| Power Supply Failure | System Power Supply Failure (Power Supply X) | Replace power supply. |
| Power Supply Inserted | System Power Supply Inserted (Power Supply X) | None |
| Power Supply Removed | System Power Supply Removed (Power Supply X) | None |
| Power Supply Not Redundant | System Power Supplies Not Redundant | Add power supply. |
| System Configuration Battery Low | Real-Time Clock Battery Failing | Replace battery. |
| AC Voltage Problem | System AC Power Problem (Power Supply X) | Check the input power voltage. |
| Power AC Overload | System AC Power Overload (Power Supply X) | <ul style="list-style-type: none"> ■ Change the input power to 220 V. ■ Add an additional power supply, or replace with one able to supply present load. ■ Reduce the load. |
| Automatic Server Recovery-2 | | |
| System Stops Responding | ASR Lockup Detected: Cause | Call the Compaq authorized service provider or Compaq technical support for diagnosis. |

continued

Table 3-19
Event Messages *continued*

| Event Type | Event Message | Recommended Action |
|-------------------------|---|--|
| Operating System | | |
| System Stops Responding | Blue Screen Trap: Cause [NT] | Refer to the documentation for the operating system. |
| | Kernel Panic: Cause [UNIX] | |
| | Abnormal Program Termination: Cause [NetWare] | |
| Automatic OS Shutdown | Automatic Operating System Shutdown Initiated Due to Fan Failure | Refer to the documentation for the operating system. |
| | Automatic Operating System Shutdown Initiated Due to Overheat Condition | |
| | Fatal Exception (Number X, Cause) | |

Rapid Error Recovery

Compaq servers provide rapid recovery services for diagnosing and recovering from errors. These tools are available for local and remote diagnosis and recovery.

Rapid recovery means fast identification and resolution of complex faults. The Rapid Recovery Engine and Insight Management Agents notify the system administrator when a failure occurs, ensuring that the server experiences minimal downtime. You enable these features through the System Configuration Utility. These integrated server management features are:

- Automatic Server Recovery-2 (ASR-2)
- ASR-2 Integrated Management Log (IML) Messages
- Server Health Logs (on servers not supporting IMLs)
- Storage Fault Recovery Tracking
- Storage Automatic Reconstruction
- Network Interface Fault Recovery Tracking
- Memory Fault Recovery Tracking (with option upgrade kit)

These are discussed in more detail on the Server Documentation CD.

Automatic Server Recovery-2

Automatic Server Recovery-2 (ASR-2) allows the server to restart automatically from the operating system or the Compaq Utilities. To use this feature, you must use the System Configuration Utility to install Compaq Utilities in the system partition.

You can enable the ASR-2 feature to restart a server after a critical hardware or software error occurs. If a critical error occurs, the server records the error information in the IML, restarts the system, and then pages you. Using the System Configuration Utility, configure the system for automatic recovery or for attended local or remote access to diagnostic and configuration tools.

NOTE: ASR-2 is only available on operating systems using the ASR-2 drivers provided by Compaq.

You can also configure ASR-2 to page an administrator when the system restarts. ASR-2 depends on the application and driver that routinely notify the ASR-2 hardware of proper system operations. If the time between ASR-2 notifications exceeds the specified period, ASR-2 assumes a fault has occurred and initiates the recovery process.

To configure ASR-2:

1. Run the System Configuration Utility.
2. Select View, then Edit Details.
3. Set the software error recovery status to Enabled.
4. Set the software error recovery timeout.

The available recovery features are:

- **Software Error Recovery**—automatically restarts the server after a software-induced server failure
- **Environmental Recovery**—allows the server to restart when temperature, fan, or AC power conditions return to normal

Unattended Recovery

For unattended recovery, ASR-2 performs the following actions:

- Logs the error information to the IML
- Resets the server
- Pages you (if a modem is present, and you selected Paging)
- Tries to restart the operating system

Often the server restarts successfully, making unattended recovery the ideal choice for remote locations where trained service personnel are not immediately available.

If ASR-2 cannot restart the server within 10 attempts, it places a critical error message in the IML, starts the server into Compaq Utilities, and enables remote access (if you configured remote access).

To use this level of ASR-2, you must configure ASR-2 to load the operating system after restart.

Attended Recovery

For attended recovery, ASR-2 performs the following actions:

- Logs the error information to the IML
- Resets the server
- Pages you (if a modem is present, and you selected Paging)
- Starts Compaq Utilities from the hard drive
- Enables remote access

During system configuration, these utilities are placed on the system utilities partition of the hard drive.

If you have configured for Dial-In access and have a modem with an auto-answer feature installed, you can dial in and remotely diagnose or reconfigure the server.

If you have configured the Compaq Utilities for network access, you can access the utilities over the network. You can use Compaq Insight Manager for dial-in or network access.

Hardware Requirements

To use this level of ASR-2 over a modem, you need the following:

- A third-party PCI or optional Hayes modem
- System Configuration Utility and Diagnostics Utility installed on the system partition of the hard drive
- ASR-2 configured to load Compaq Utilities after restart

Remote Operations

To run Compaq Utilities remotely over an IPX using the Network feature, you need Compaq Insight Manager 2.0 or later or an NVT (Novell Virtual Terminal) Terminal Emulator with VT100 or ANSI terminal capabilities.

To run Compaq Utilities remotely over an IP network, you need Compaq Insight Manager 2.10 or later or a Telnet Terminal Emulator with VT100 or ANSI capabilities. If you are notified that ASR-2 restarted the server and you have restarted to Compaq Utilities, use the INSPECT Utility or Compaq Insight Manager to view the critical error in the Critical Error Log. Run Diagnostics to diagnose and resolve the problem.

Automatic Server Recovery (ASR-2)–Other Uses

You can configure ASR-2 to restart the server into Compaq Utilities to diagnose the critical error or to start the operating system to return the server to operational status as rapidly as possible.

When you enable ASR-2 to start the operating system, the server tries to start from the primary partition. In this mode, ASR-2 can page you if a critical error occurs, but you cannot access Compaq Utilities.

When you enable ASR-2 to start Compaq Utilities, the server restarts after a critical error and loads Compaq Utilities from the system partition onto the hard drive.

Starting Compaq Utilities

You can configure the server to start Compaq Utilities in four different ways:

- Without remote console support; for example, to run Compaq Utilities from the server console only
- With remote console support using modems for dial-in access
- With remote console support using a modem to dial a predetermined telephone number
- With remote console support through a network connection (IP or IPX)

Table 3-20
Automatic Server Recovery-2 (ASR-2) Features

| Features | Definition |
|-------------------------------------|---|
| Software error recovery | When enabled, ASR-2 is activated if the operating system hangs or stops responding, resulting in a lockup. |
| Software error recovery timeout | Determines how long the server waits before enabling ASR-2 after an operating system lockup. |
| Standby recovery server option | When enabled, ASR-2 activation initiates a switch to a designated standby recovery server. |
| Standby recovery server port | Port used to communicate with the recovery server. |
| Standby recovery time-out | Determines how long the server waits to initiate a switch to a designated standby recovery server after ASR-2 activation. |
| Software error recovery boot option | Allows the server to restart, either initiating the operating system or Compaq Utilities. |
| Thermal shutdown | When enabled, shuts down the server if a critical thermal error occurs. |
| UPS shutdown | When enabled, allows the server to perform a shutdown if an uninterruptible power supply (UPS) is activated. |
| UPS shutdown threshold | Determines how long the server waits to shut down after the UPS is activated. If desired, this setting should provide enough time for an administrator to perform any necessary operations or to properly shut down the server. |

Compaq Integrated Remote Console

The standard Compaq Integrated Remote Console performs a wide range of configuration activities. Console features include:

- Is accessible using ANSI terminal
- Operates independently of the operating system
- Provides for remote server restart
- Provides access to system configuration
- Uses out-of-band communication with dedicated management modem installed in the server

For more information, refer to the *Integrated Remote Console User Guide* that shipped with the server.

IMPORTANT: Before configuring ASR-2, verify that the System Configuration Utility and Diagnostics software are installed on the system partition. ASR-2 must have this software to start Compaq Utilities after a system restart. Compaq recommends verifying that the System Configuration Utility and the Diagnostics software is installed even if you configure ASR-2 to start the operating system.

Compaq Health Driver

The Compaq Health Driver continually resets the ASR-2 timer according to the frequency specified in the System Configuration Utility (for example, 10 minutes). If the ASR-2 timer counts down to zero before being reset, due to an operating system or a server lockup, ASR-2 restarts the server into either Compaq Utilities or the operating system (as indicated by the System Configuration parameters). The default value is 10 minutes. The allowable settings are 5, 10, 20, and 30 minutes.

For remote and offsite (unattended) servers, setting the software error recovery timeout for 5 minutes reduces server downtime and allows the server to recover quickly. For local (attended) servers located onsite, you can set the software error recovery timeout for 20 or 30 minutes, giving you time to arrive at the server if you wish to manually diagnose the problem.

The Compaq Health Driver is independent of the ASR-2 timer. Load the health driver and enable the ASR-2 timer. Enabling the ASR-2 timer allows the driver to detect and log information into the IML regarding numerous hardware and software errors. However, you cannot enable the ASR-2 timer without loading the Compaq Health Driver.

Before ASR-2 restarts the server, it records any information available about the condition of the operating system in the Critical Error Log or the IML depending on the server support. This information can be used to diagnose an operating system crash or server lockup, while still allowing the server to be restarted.

The following ASR-2 flowchart shows the sequence of events after a hardware or software error occurs:

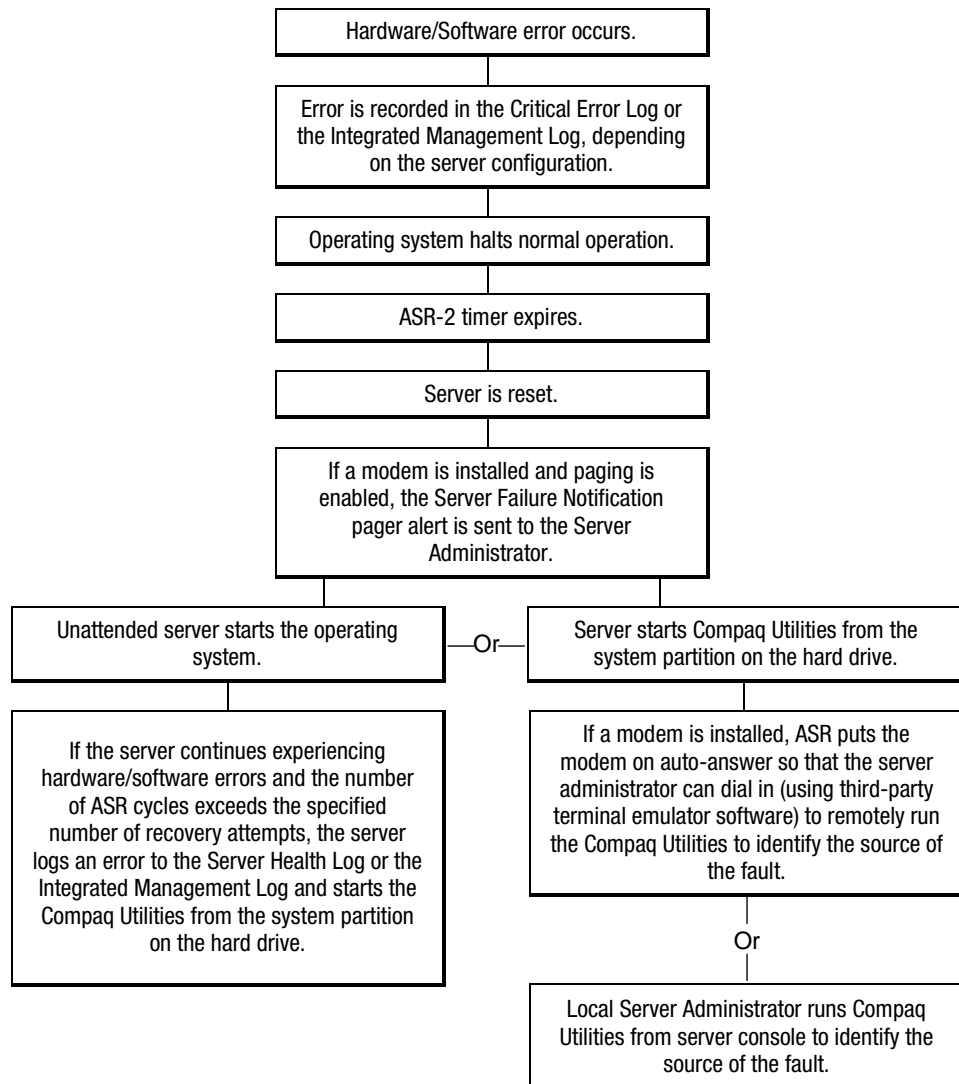


Figure 3-1. ASR-2 flowchart

Initializing Compaq Utilities

When you enable ASR-2 to start into Compaq Utilities and a critical error occurs, the operating system-specific Health Driver logs the error information into the Critical Error Log or the IML and the ASR-2 feature restarts the server. When the system reinitializes, the system pages the designated administrator (if enabled), and starts Compaq Utilities from the hard drive.

If Dial-In status is enabled, the modem is placed in auto-answer mode. If you enable Dial-Out status, you are automatically enabled for Dial-In.

If Network Status is enabled, the appropriate network support software is loaded, depending on the network protocol, IP or IPX. Having the appropriate network software allows remote access via the network.

IMPORTANT: Compaq Utilities are loaded from a specially created system partition on the hard drive. This partition was configured during server configuration.

You can access the server and view the Server Health Logs (in servers not supporting the IML) remotely by modem, in-band over the network, or directly from the server. For modem access, you must have either Compaq Insight Manager 2.0 or above, or have a VT100 or ANSI terminal type device. You may use a standard CRT with VT100 or ANSI emulation capability, or you may use a PC with a VT100 or ANSI terminal emulation package. The communication parameters must be set for 8 data bits, no parity, and 1 stop bit.

You can also enable ASR-2 to allow network access using the Network Status feature in the System Configuration Utility. You must have either Compaq Insight Manager 2.0 or greater or a Novell Virtual Terminal (NVT) emulator on an IPX network to use this feature. You must also have System Configuration Utility version 2.24 or later. For IP access, you must have Compaq Insight Manager 2.10 or later, or a Telnet Terminal emulator to use this feature. You also must have version System Configuration Utility 2.24 or later.

The System Configuration Utility settings should resemble the settings in Table 3-21 when you enable ASR-2 to start into Compaq Utilities.

Table 3-21
Compaq System Configuration Utility Pager Settings for Starting into Compaq Utilities

| Pager Data | Setting | Description |
|-------------------|------------------|---|
| Pager status | Enabled | Indicates whether the pager feature is enabled or disabled. |
| Pager dial string | ATDT 555-5555 | Indicates the pager dial string and delay before the pager message; pagers typically use one of the following formats: Local pagers: ATDT 555-5555 Wide area pagers: ATDT 1-800-555-5555,1234567# |
| Pager message | 1234567# | Represents a unique number (maximum seven digits, numeric only) that you must designate to identify the server on the pager display. The ROM adds a three-digit code to the front of this number. The first two digits indicate the subsystem and the third digit indicates the severity of the error that caused the alert. The # symbol usually terminates the message. If no message is required, delete the # symbol. |

continued

Table 3-21
Compaq System Configuration Utility Pager Settings for Starting into Compaq Utilities *continued*

| Pager Data | Setting | Description |
|--------------------|----------------------------|---|
| Pager test | Select to test pager setup | Use this to test the current pager settings. Press Enter to dial the pager number, and the pager message (if present) displays. You must configure the computer before testing the pager, and the Pager Status must be set to Enabled. Do not test the pager if you are running remotely and are using only one modem. |
| Serial interface | COM1 | Select the communications port for the modem used by the pager and the remote ASR-2 functions. The options are COM1 and COM2. |
| Dial-In status | Enabled | <p>Set Dial-In Status to Enabled. Be sure the Reset Boot option is set to Boot Compaq Utilities. When the system starts because of an ASR-2 reset, it starts to the Compaq Utilities, sets the Management Modem to auto-answer, and waits for the administrator to dial in and run the Compaq Utilities.</p> <p>You automatically disable this option when you configure the software error recovery start option to Boot Operating System. When ASR-2 pages you, you cannot dial in unless ASR-2 exceeds 10, the threshold number of server restart retries. When this happens, ASR-2 restarts the server into the Compaq Utilities and places the modem in auto-answer mode.</p> |
| Dial-Out status | Enabled | <p>Allows ASR-2 to dial out to a remote workstation. If you selected this option, Dial-In Status is automatically selected.</p> <p>To use the Dial-Out feature, set Dial-Out Status to Enabled and set the Dial-Out String to the correct telephone number. You must also set the Reset Boot option to Boot Compaq Utilities. When the system restarts because of an ASR-2 reset, the administrator is paged via Pager Status and Pager Dial String, the system restarts to the Compaq Utilities, and dials out to the phone number provided in the Dial-Out string. The dial-out number is tried five times. If it fails to connect after five attempts, the modem is put in auto-answer mode.</p> |
| Dial-Out string | 555-1234 | Enter the dial string followed by the remote computer telephone number. |
| Network status | Enabled | To allow network access to Compaq Utilities, set Network Status to Enabled and ensure that the Reset Boot option is set to Boot Compaq Utilities. |
| Network protocol | | <p>To use IPX network access, set Network Protocol to IPX. When the system restarts to the Compaq Utilities because of an ASR-2 reset, it loads IPX network support. This enables remote access using NVT.</p> <p>To use IP network access, set Network protocol to IP. Also make sure to set Network IP address, Network IP net mask, and Network IP router address. When the system restarts to the Compaq Utilities because of an ASR-2 reset, it loads IP network support. This enables remote access using Telnet.</p> <p>Note: The Network Status must be set to Enabled for network access.</p> |
| Network controller | Compaq | For all Compaq standard network controllers. |

continued

Table 3-21
Compaq System Configuration Utility Pager Settings for Starting into Compaq Utilities *continued*

| Pager Data | Setting | Description |
|---|-------------|---|
| Network host name | CPQHOU | Enter the network name of the server. Use underscores instead of spaces within the name—for example, Compaq_Server. If you are using IPX network access to the Compaq Utilities, this server name is used to advertise NVT host services. This server name displays in the Compaq Insight Manager server list when the program determines it can communicate using NVT. Set this name to be the same as the server name you assign when the host OS is running. |
| Network Interface Controller (NIC) slot | Slot # | Select the slot number of the NIC you wish to use for network access to Compaq Utilities. |
| Network frame type | ETHERNET_II | Select the frame type for the network. Selections include both Ethernet and Token-Ring topologies. |
| Network IP address | | Enter the IP address for this server in standard dot notation. Note: This is not used if you select Custom for Network controller. You must enter the IP address into the NET.CFG file that you load into the system partition. |
| Network IP net mask | | Enter the net mask for this server in standard dot notation. Note: This is not used if you select Custom for network controller. You must enter the IP address into the NET.CFG file that you load into the system partition. |
| Network IP router address | | Enter the router to be used for this server in standard dot notation. Note: This is not used if you select Custom for network controller. You must enter the IP address into the NET.CFG file that you load into the system partition. |

If you configure the server to restart, and then access the Compaq Utilities menu, it prepares for remote communications. You can run Compaq Diagnostics, INSPECT, or the server-setup utility remotely by using a workstation running terminal emulation software, such as Compaq Insight Manager.

Initializing the Operating System

When you enable ASR-2 to restart into the operating system and a critical error occurs, ASR-2 logs the error into the Critical Error Log or IML, and restarts the server. The system ROM pages the designated administrator, then executes the normal restart process.

IMPORTANT: When you enable ASR-2 to restart into the operating system, Modem Dial-In Status, Network Status, and Modem Dial-Out Status are automatically disabled. In this mode, ASR-2 can page you if a critical error occurs, but you cannot access the server, and the server cannot dial out to a remote workstation.

If the ASR-2 feature cannot restart the server within 10 attempts, it logs a critical error into the Critical Error Log or IML restarts the server into the Compaq Utilities, and puts the modem into auto-answer mode.

The System Configuration Utility setting should resemble the settings in Table 3-22 when you enable ASR-2 to restart into the operating system:

Table 3-22
Operating System Restart SCU Setting for ASR-2

| Option | Setting |
|------------------------------|-----------------|
| Serial interface | COM1 |
| Dial-In status | Disabled |
| Dial-Out status | Disabled |
| Dial-Out string | 555-1234 |
| Network status | Disabled |
| Network protocol | IPX |
| Network interface controller | Compaq |
| Network host name | CPQHOU |
| Network controller slot | Slot # |
| Network frame type | ETHERNET_II |
| Network IP address | xxx.xxx.xxx.xxx |
| Network IP net mask | xxx.xxx.xxx.xxx |
| Network IP router address | xxx.xxx.xxx.xxx |

ASR-2 Security

The standard Compaq password features function differently during ASR-2 than during a typical system startup. During ASR-2, the system does not prompt for the power-on password. Not prompting a power on password allows ASR-2 to restart the operating system or Compaq Utilities without user intervention.

To maintain system security, set the server to start in Network Server Mode (an option in the System Configuration Utility). This option ensures that the server keyboard is locked until you enter the keyboard password.

Select an administrator password (an option in the System Configuration Utility). During attended ASR-2 (local or remote), you must enter this administrator password before any modifications can be made to the server configuration.

Server Health Logs

In some servers, Server Health Logs are replaced by the IML, if it is supported. Server Health Logs contain information to help identify and correct any server failures and correlate hardware changes with server failure. Server Health Logs are stored in nonvolatile RAM and consist of the Critical Error Log and the Revision History Table.

If errors occur, information about the errors is automatically stored in the Critical Error Log.

Whenever boards or components (that support revision tracking) are updated to a new revision, the Revision History Table is updated.

ASR-2 Integrated Management Log Messages

The IML, or Critical Error Log for Server Health Log, records memory errors, catastrophic hardware errors, and software errors that causes system failures. This information helps to quickly identify and correct the problem, thus minimizing downtime.

You can view the IML or Critical Error Log, through Compaq Insight Manager. The Diagnostics Utility either resolves the error or suggests corrective action in systems that do not support event logs.

The IML or Critical Error Log, identifies and records all the errors identified in Table 3-23.

Table 3-23
ASR-2 IML or Critical Error Log Messages

| Message | Description |
|--|--|
| Abnormal Program Termination | The operating system encountered an abnormal situation that caused a system failure. |
| ASR-2 detected by ROM | An ASR-2 activity was detected and logged by the system ROM. |
| ASR-2 Test Event | The System Configuration Utility generated a test alert. |
| Automatic Server Recovery Base Memory Parity Error | The system detected a data error in base memory following a reset due to the ASR-2 timer expiration. |
| Automatic Server Recovery Extended Memory Parity Error | The system detected a data error in extended memory following a reset due to the ASR-2 timer expiration. |
| Automatic Server Recovery Memory Parity Error | The system ROM was unable to allocate enough memory to create a stack. Then, it was unable to put a message on the screen or continue starting the server. |
| Automatic Server Recovery Reset Limit Reached | The maximum number of system resets due to ASR-2 timer expiration was reached, resulting in the loading of Compaq Utilities. |

continued

Table 3-23
ASR-2 IML or Critical Error Log Messages *continued*

| Message | Description |
|---|---|
| Battery Failing | Low system battery warning. Replace battery within 7 days to prevent loss of nonvolatile configuration memory. Failure of the battery supporting the system nonvolatile RAM is imminent. |
| Caution: Temperature Exceeded | The operating system detected that the temperature of the system exceeded the caution level. Accompanying data in the log notes if an auto-shutdown sequence was invoked by the operating system. |
| Diagnostic Error | An error was detected by the Diagnostics Utility. See the specific error code in this chapter for a detailed explanation. |
| Error Detected On Boot Up | The server detected an error during the Power-On Self-Test (POST). |
| NMI – Automatic Server Recovery Timer Expiration | The operating system received notice of an impending ASR-2 timer expiration. |
| NMI – Expansion Board Error | A board on the expansion bus indicated an error condition, resulting in a server failure. |
| NMI – Expansion Bus Master Timeout | A bus master expansion board in the indicated slot did not release the bus after its maximum time, resulting in a server failure. |
| NMI – Expansion Bus Slave Timeout | A board on the expansion bus delayed a bus cycle beyond the maximum time, resulting in a server failure. |
| NMI – Fail-Safe Timer Expiration | Software was unable to reset the system fail-safe timer, resulting in a server failure. |
| NMI – PCI Bus Parity Error | A parity error was detected on the PCI bus. |
| NMI – Processor Parity Error | The processor detected a data error, resulting in a server failure. |
| NMI – Software Generated Interrupt Detected Error | Software indicated a system error, resulting in a server failure. |
| Processor Exception | The indicated processor exception occurred. |
| Processor Prefailure | A CPU passed an internal corrected error threshold; excessive internal ECC cache errors. |
| Required System Fan Failure | The required system fan failed. Accompanying data in the log notes if an auto-shutdown sequence was invoked by the operating system. |
| Server Manager Failure | An error occurred with the Server Manager/R board. |
| UPS AC Line Failure Shutdown or Battery Low | The UPS notified the operating system that the AC power line failed. Accompanying data indicates an auto-shutdown sequence was invoked or the battery was nearly depleted. |

Revision History Table

Some errors can be resolved by reviewing changes to the server configuration. The server has an Automatic Revision Tracking (ART) feature that helps you review recent changes to the server configuration.

One ART feature is the Revision History Table, which contains the hardware version number of the system board and any other system boards providing ART-compatible revision information. This feature allows you to determine the level of functionality of an assembly in a system without opening or powering down the unit.

Table 3-24
Revision History Table

| Current Revisions | |
|---------------------------|----------|
| Date | 10/31/98 |
| System board revision | 03 |
| Assembly version | 1 |
| Functional revision level | C |
| Processor 01 revision | 01 |
| Assembly version | 1 |
| Functional revision level | A |
| Previous Revisions | |
| Date | 9/21/98 |
| System board revision | 03 |
| Assembly version | 1 |
| Functional revision level | C |
| Processor 01 revision | 01 |
| Assembly version | 1 |
| Functional revision level | A |

The Revision History Table is stored in nonvolatile RAM and is accessed through the INSPECT Utility and Compaq Insight Manager.

Storage Fault Recovery Tracking

This feature tracks over 12 failure-indication parameters, such as timeouts, spin-up errors, and self-test errors of SCSI drives. You can use these parameters to pinpoint failed storage subsystem components and to recover from controller or hard drive failure.

Storage Automatic Reconstruction

This feature automatically reconstructs data to an online spare or to a replaced drive if a drive fails. To use the reconstruction feature, you must configure the server for drive mirroring or data guarding. The reconstruction decreases system downtime by allowing rapid recovery to full system operation if a drive fails.

Network Interface Fault Recovery Tracking

This feature tracks over 20 failure indication parameters, such as alignment errors, lost frames, and frame copy errors of Ethernet and Token-Ring network interfaces. It decreases network downtime by enabling diagnosis of actual network interface failures.

Memory Fault Recovery Tracking

This feature inspects the operation of the memory subsystem looking for uncorrectable memory errors.

Remote Management Features

Compaq servers have the following management features that you can access through a modem or a network:

Table 3-25
Compaq Servers Remote Management Features

| Feature | Description |
|------------------------|--|
| Service Session | Provides remote access to all the utilities on the system partition, including Diagnostics utilities, INSPECT, ROMPaq, Drive Array Advanced Diagnostics (DAAD), and the System Configuration Utility. Also provides the capability for remote file transfer services to and from the system partition. |
| Disk-Based Diagnostics | Provides remote diagnostic capability after you configure ASR-2 and the reset restart option to restart from Compaq Utilities. Also allows you to view Health Logs. Disk-based diagnostics can also be run locally. Press F10 during the restart process when the cursor moves to the upper-right corner of the monitor. |
| Server Restart | Provides the ability to restart the server remotely from Compaq Insight Manager while the operating system is running. Allows the server to restart back to the operating system or restart to the system partition. Provides a complete system reset to all peripherals. If you select Boot to Compaq Utilities from Compaq Insight Manager, Compaq Utilities loads the appropriate remote services so that remote access is available. If network status is enabled, network support is loaded. If Dial-In status is enabled, the modem is set to auto-answer. |
| Configuration Utility | Allows you to run the remote System Configuration Utility locally. Press F10 during the restart process when the cursor moves to the upper-right corner of the monitor. |
| Firmware Updates | Allows you to update the server firmware remotely. Uses firmware images on the system partition that might have been previously uploaded with the file transfer services. |

ROMPaq Error Recovery Options

From time to time it may be desirable to upgrade the current system ROM. Some reasons for this may be as follows:

- Customer desires ROM upgrade
- Obtained new SmartStart CD-ROM
- Desire to upgrade server processors
- Request from Compaq

The process of upgrading the system ROM is referred to as flashing the ROM. Flashing consists of using software to replace the current ROM image with a new one through ROMPaq.

Should an error such as a power failure occur during this process, the flash operation is not completed, causing the ROM image in the server to be corrupted. Compaq provides two options for ROMPaq recovery, depending on the server and circumstances involved.

ROMPaq Disaster Recovery

If a server does not have a valid ROM image, perform the following process:

IMPORTANT: This operation should be performed on a server with redundant ROM **ONLY IF** both ROM images have been corrupted. If only one image is corrupted, read the section following, "Redundant ROM Image Recovery" for complete instructions.

1. Create a new ROMPaq diskette, using the latest version for the server involved.

IMPORTANT: If the ROM is corrupted by a ROMPaq interruption, the initial ROMPaq attempt may have affected the contents of the original diskette.

2. Power down the server.
3. Activate disaster recovery mode by setting the configuration switches on the system maintenance switch block.

IMPORTANT: These switch settings are different for each server. Refer to the switch setting information contained in the user documentation provided for your server to find these settings for your server.

Make a note of the positions of all switches in this switch box, so they may be restored after successful completion of this process.

4. Insert the ROMPaq diskette.

Although you utilize a standard ROMPaq diskette, the old ROM image is not saved during this process.

5. Power up the server.

The keyboard, mouse, and monitor are all inactive. The server generates two long beeps to indicate you are in Disaster Recovery Mode.

6. The server analyzes the diskette, searching for the latest ROM image. If the diskette is not in place, the system continues to beep until a valid ROMPaq diskette is inserted.
7. The ROMPaq diskette flashes the system ROM.
8. At the successful completion of this process, a sequence of audible ascending beeps is generated.
9. After successful completion of this process, follow these steps:
 - a. Power down the server.
 - b. Reset configuration switches.
 - c. Power up the server as usual.

–Or–

After a failed ROMPaq upgrade procedure, power down the server and repeat the above process.

IMPORTANT: If you are performing this procedure on a server with redundant ROM, and both ROM images have been corrupted, repeat the process in succession (once for each corrupted image). If only one image is corrupted, read the following section, “Redundant ROM Image Recovery” for complete instructions.

Redundant ROM Image Recovery

If power is interrupted during the flash process, a server with redundant ROM powers up as usual, but the inactive (redundant) ROM image is corrupted.

A POST error message displays:

105 – Current System ROM is corrupt – now booting redundant System ROM.

In this instance, you are required to flash again so that the invalid image is now valid. After you flash the invalid image, the system boots to that image—which was the original objective.

Compaq Insight Manager

Compaq Insight Manager is a comprehensive management tool to monitor and control the operation of Compaq servers and clients. Compaq Insight Manager consists of two components: a Windows-based console application, and server- or client-based management data collection agents. Starting with Compaq Insight Manager 4.0, the agents for Windows NT and NetWare are also Web-enabled; that is, these agents enable Web browser access and monitoring of management information.

The management agents monitor more than 1,000 management parameters. Key subsystems are instrumented to make health, configuration, and performance data available to the agent software. The agents act upon that data by initiating information such as network interface or storage subsystem performance statistics.

Features of Compaq Insight Manager

Compaq Insight Manager includes the following:

- Web browser access to Insight Manager Device and Configuration information is available anywhere you have network access and a standard Web browser for Windows and NetWare servers.
- Comprehensive fault management allows proactive management of the distributed enterprise by alerting you in advance of potential system failures.
- Windows NT monitoring capability allows faster determination of the root cause of system and application faults by being able to quickly determine whether hardware or software causes an event.
- Broad configuration management provides effective deployment and maintenance of consistent, manageable configurations with Insight Version Control and Integration Server Maintenance. Version Control and Integration Server Maintenance allows the administrator to monitor and update versions of the server and workstation firmware, drivers, and utilities.
- Performance management/resource utilization helps determine how servers are utilized, and if upgrades or updates are necessary to increase overall system performance.
- Full integration with Compaq Remote Insight Board/PCI and ProLiant Integrated Remote Console allows “in-band” and “out-of-band” connection for server management. This capability ensures that customers are in touch with their systems, even when servers are offline or without power.
- Simple Network Management Protocol (SNMP) standards provide integration with other management products.
- Flexible network conductivity supports multiple transport protocols including IPX, TCP/IP, and PPP to operate over LANs, WANs, and modems.
- Support for the following leading operating systems:
 - Microsoft Windows NT
 - Novell NetWare, IntranetWare, and IntranetWare for Small Business
 - SCO UNIX, OpenServer, and UnixWare
 - IBM OS/2 Warp family of products

- In Compaq servers, every hardware subsystem (such as disk storage, system memory, and system processor) has a robust set of management capabilities. Compaq Full-Spectrum Fault Management prevents faults before they happen, keeps the system up and running in the unlikely event of a failure, and delivers rapid server recovery to normal operation after a fault.

Compaq Insight Manager Software Architecture

The Compaq Insight Manager software architecture is typical of other network management solutions. It has a client/server architecture and is composed of agent software (Compaq Insight Management Agents) and the management application software (Compaq Insight Manager).

Insight Management Agents

Insight Management Agents operate on Compaq systems (such as servers and workstations), performing in-depth monitoring of the state of the system by collecting and measuring system parameters. These parameters indicate the current state of subsystems by counting the occurrence of particular events (for example, the number of read operations performed on a disk drive) or monitoring the state of a critical function (such as whether the cooling fan is operating).

Insight Desktop Agents operate on Compaq *Deskpro*TM computers, monitoring functions that include temperature sensing and disk prefailure alerting.

Insight Agents provide information to management applications, such as Compaq Insight Manager, and can generate alarm notifications if significant changes occur in the fault or performance aspects of system operation. Information is delivered to and from the Insight Agents by the industry-standard SNMP.

Compaq Insight Manager

Compaq Insight Manager delivers intelligent monitoring and alerting as well as visual control of the Compaq hardware. In the unlikely event of hardware failures, Compaq Insight Manager also provides a full complement of remote maintenance and control facilities.

For additional information, refer to the online *Compaq Insight Manager User Guide* on the Server Documentation CD that accompanied the server.

Chapter **4**

Connectors, Switches, and LED Indicators

This chapter provides connector, switches, and LED indicator information for the Compaq ProLiant DL580 server.

Connectors

This section contains graphics and tables that show connector locations on the rear panel, system board, peripheral board, power backplane board, and the SCSI hard drive cage backplane board of the ProLiant DL580 server.

Rear Panel Connectors

Figure 4-1 shows the rear panel connectors for the ProLiant DL580 server. Table 4-1 identifies the corresponding connector descriptions.

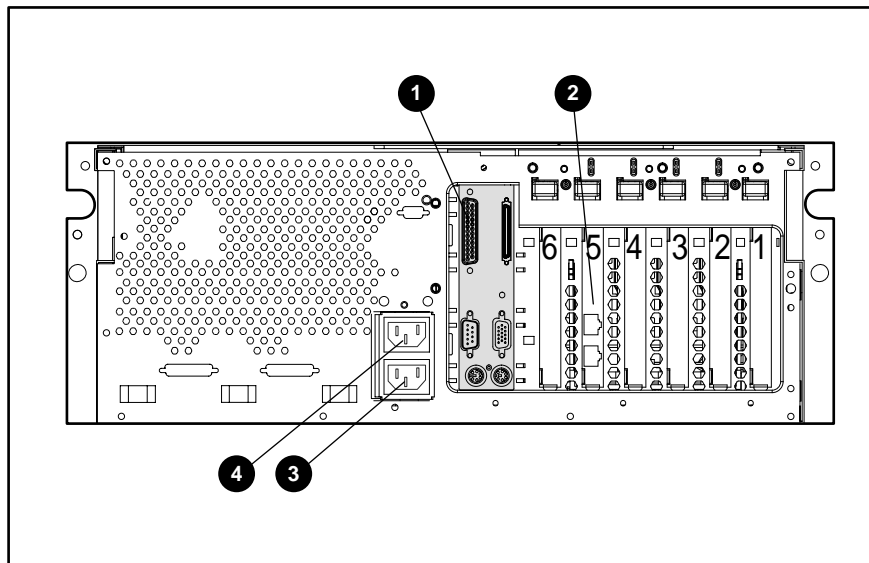


Figure 4-1. Rear panel connectors

Table 4-1
Rear Panel Connectors

| Item | Description |
|------|--|
| ❶ | Peripheral board connectors (See “peripheral board connectors” later in this chapter.) |
| ❷ | Network interface controller (NIC) with dual connectors |
| ❸ | AC power connector for power supply 1 |
| ❹ | AC power connector for power supply 2 |

System Board Connectors

Figure 4-2 shows the system board connectors for the ProLiant DL580 server. Table 4-2 lists the corresponding connector descriptions.

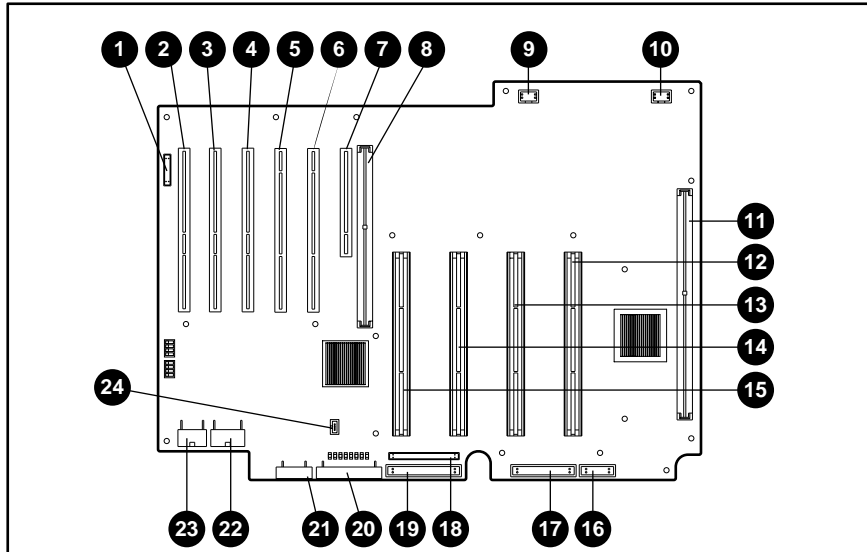


Figure 4-2. System board connectors

Table 4-2
System Board Connectors

| Item | Connector | Item | Connector |
|------|--|------|--|
| 1 | Hot-plug LED switchboard | 13 | Processor slot 2 |
| 2 | PCI slot, 33-MHz/64-bit (non-hot-plug) | 14 | Processor slot 3 |
| 3 | PCI slot, 33-MHz/64-bit (hot-plug) | 15 | Processor slot 4 |
| 4 | PCI slot, 33-MHz/64-bit (hot-plug) | 16 | Not used |
| 5 | PCI slot, 66-MHz/64-bit (hot-plug) | 17 | Diskette drive |
| 6 | PCI slot, 66-MHz/64-bit (hot-plug) | 18 | High-density CD-ROM IDE |
| 7 | PCI slot, 33-MHz/32-bit (non-hot-plug) | 19 | IDE (not used) |
| 8 | Peripheral board slot (non-hot-plug) | 20 | Power supply backplane sense connector |
| 9 | Not used | 21 | Not used |
| 10 | Not used | 22 | Power supply connector |
| 11 | Memory board slot | 23 | Power supply connector |
| 12 | Processor slot 1 | 24 | Virtual power button connector |

Peripheral Board Connectors

Figure 4-3 shows the peripheral board connectors for the ProLiant DL580 server. Table 4-3 identifies the corresponding connector descriptions.

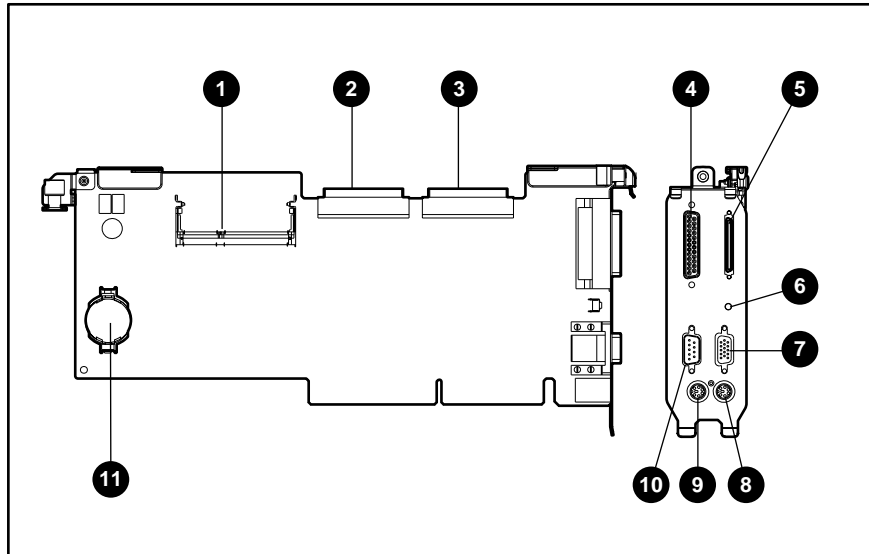


Figure 4-3. Peripheral board connectors

Table 4-3
Peripheral Board Connectors

| Item | Description |
|------|---|
| ① | Integrated Smart Array Controller connector |
| ② | SCSI port 1 connector |
| ③ | SCSI port 2 connector (not used) |
| ④ | Parallel port connector |
| ⑤ | VHDC SCSI connector (tape drives only) |
| ⑥ | NMI switch access (debugging only) |
| ⑦ | Video connector |
| ⑧ | Mouse connector |
| ⑨ | Keyboard connector |
| ⑩ | Serial connector |
| ⑪ | Battery connector |

Power Backplane Board Connectors

Figure 4-4 shows the power backplane board connectors for the ProLiant DL580 server. Table 4-4 identifies the corresponding connector descriptions.

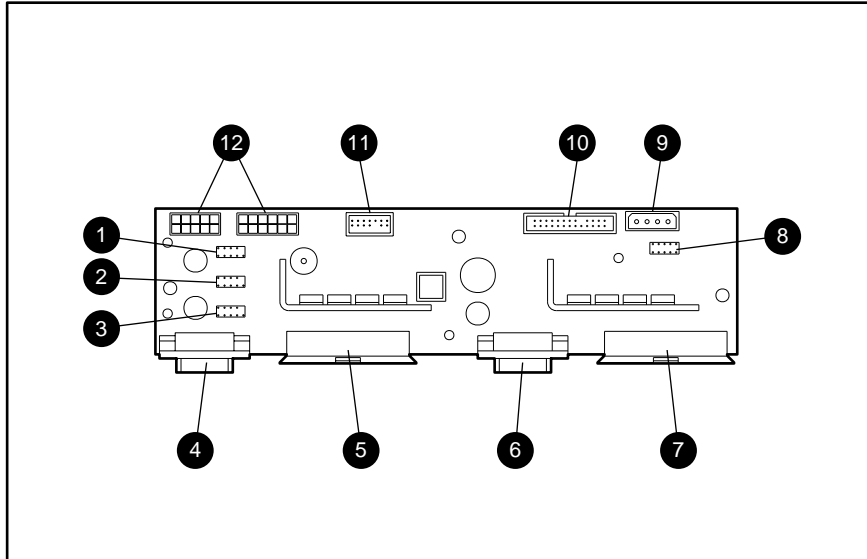


Figure 4-4. Backplane board connectors

Table 4-4
Power Backplane Board Connectors

| Item | Description |
|------|---|
| ① | Fan connector for fan assembly 7 and 8 |
| ② | Fan connector for fan assembly 3 and 4 |
| ③ | Fan connector for fan assembly 1 and 2 |
| ④ | Miscellaneous signal connector |
| ⑤ | Power supply connector |
| ⑥ | Miscellaneous signal connector |
| ⑦ | Power supply connector |
| ⑧ | Fan connector for fan assembly 5 and 6 |
| ⑨ | SCSI hard drive backplane board power connector |
| ⑩ | Power supply sense cable connector |
| ⑪ | Power switch cable and LED connector |
| ⑫ | Power connectors |

SCSI Hard Drive Backplane Board Connectors

Figure 4-5 shows the SCSI hard drive backplane board connectors for the ProLiant DL580 server. Table 4-5 identifies the corresponding connector descriptions.

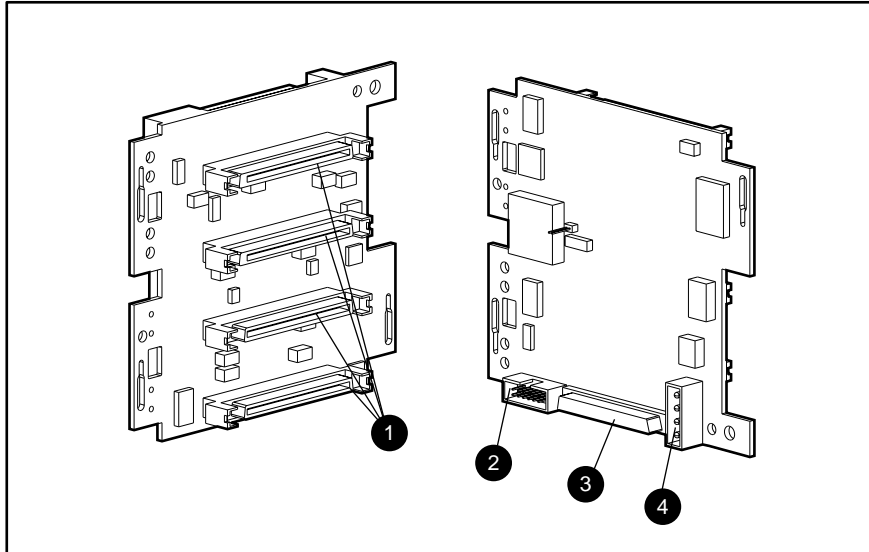


Figure 4-5. SCSI hard drive backplane board connectors

Table 4-5
SCSI Hard Drive Backplane Board Connectors

| Item | Description |
|------|--|
| ① | Hot-plug SCSI connectors for hard drives |
| ② | Signal connector (not used) |
| ③ | SCSI connector for input drives |
| ④ | Power connector |

Switches

Configuration (Maintenance) Switchbank (SW1)

Figure 4-6 shows the peripheral board configuration (maintenance) switchbank (SW1) location and the default settings for the ProLiant DL580 server. Table 4-6 describes the peripheral board switchbank settings.

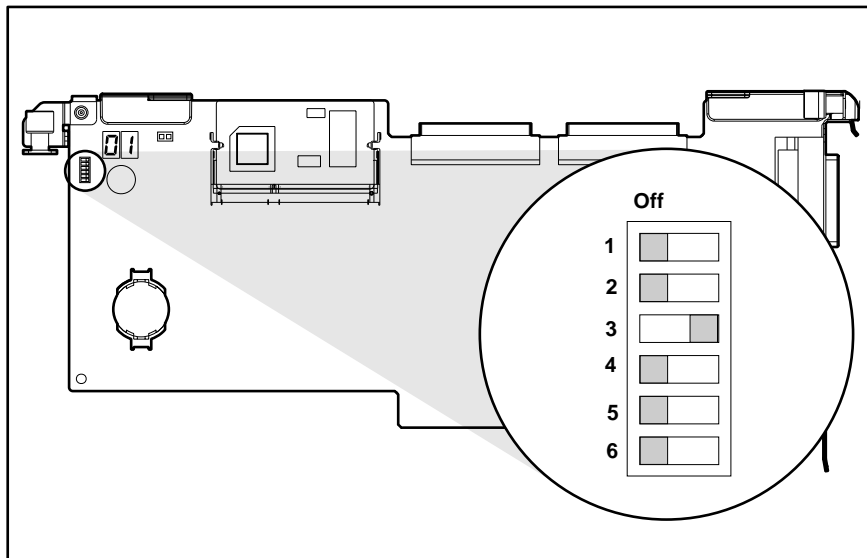


Figure 4-6. Peripheral board configuration (maintenance) switchbank (SW1) location and default settings

Table 4-6
Peripheral Board Configuration (Maintenance) Switchbank (SW1) Settings

| Switch | Function | Open (Off) Default Position | Closed (On) Position |
|--------|--------------------------|---|--|
| 1 | Video | Integrated video is enabled | Integrated video is disabled |
| 2 | Lock configuration | Configuration unlocked and can be altered | Locks system configuration and cannot be altered |
| 3 | Tower-to-rack conversion | Tower configuration | Rack-mount configuration |
| 4 | Diskette boot feature | Diskette boot can be changed through system configuration utility | Diskette drive is enabled for booting, overriding the system configuration utility |
| 5 | Power on password | Power on password feature is enabled | Power on password feature is disabled |
| 6 | Maintenance | NVRAM is valid | NVRAM is invalidated; configuration erased |

Clearing CMOS

To erase an invalid system configuration:

1. Move the S6 configuration switch (SW1) to the on position. This setting clears portions of CMOS and NVRAM.
2. Power up the server. Wait for the ProLiant logo to display on the video display.
3. Power down the server.
4. Move the S6 configuration switch to the off position.
5. Power up the server. Refer to the *Compaq ProLiant DL580 Server Setup and Installation Guide* for more information.

To clear all contents of CMOS NVRAM, remove the battery, then reinstall the battery. All device settings can now be completely reconfigured. See Figure 4-6 for SW1 and battery locations.

Processor Core Frequency (SW4) and System ID (SW6) Switches

Processor Core Frequency Switches (SW4)



CAUTION: The System ROM determines proper processor speeds. This section shows only the location of the switches and the default settings of each. These default settings must be set exactly as shown for proper operation of the ROM.

Figure 4-7 shows the location and default settings of the processor core frequency switch (SW4). Table 4-7 lists the processor core frequency switch settings for the ProLiant DL580 server with processor speeds ranging from 700 to 900 MHz.

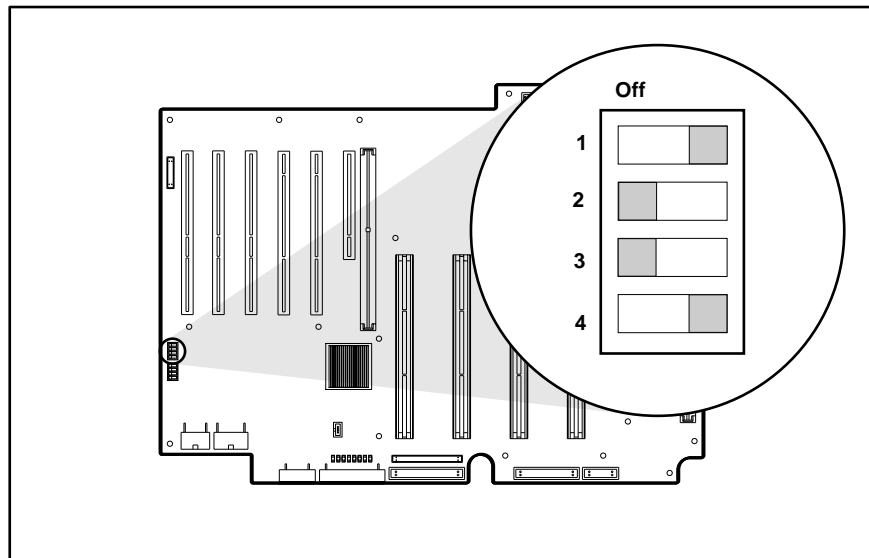


Figure 4-7. Location and default setting for processor core frequency switch (SW4)

Table 4-7
Processor Configuration Switch (SW4) 100-MHz Bus Speed

| Position | Function | Processor Core Speed Settings | |
|----------|---|-------------------------------|--|
| | | 700-MHz | |
| 1 | Sets system bus to processor core frequency ratio | On | |
| 2 | | Off | |
| 3 | | On | |
| 4 | | Off | |

Note: Compaq makes no representation or warranty that processors operating at any of the speeds shown are available at any time. Therefore, processor core speeds shown are not necessarily representative of future processors.

Note: For processors 800 MHz or higher, it is not necessary to change the switch settings.

System Board ID/Miscellaneous Switches (SW6)

Figure 4-8 shows the location of the system board ID/miscellaneous switches (SW6). Switch 1 is used to control booting from a spare processor. Switch 2 is used to disable the system board interlocks. Switches 3 and 4 are used for system chassis identification. Table 4-8 lists the functions and settings of the system board ID/miscellaneous switches.



CAUTION: These settings are factory-set and do not need to be adjusted. They are only shown here for identification and diagnostics. Refer to the *Compaq ProLiant DL580 Server Setup and Installation Guide* for additional information.

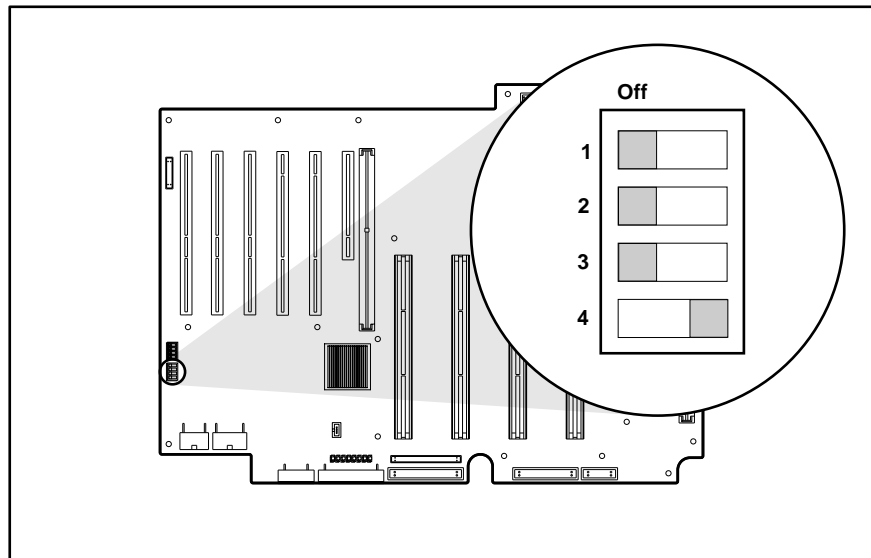


Figure 4-8. System board ID/miscellaneous switches (SW6)

Table 4-8
System Board ID/Miscellaneous Switches (SW6)

| Switches | Function | Settings |
|----------|-----------------------|-------------------------------------|
| 1 | Hot spare boot enable | Off = Enables hot spare boot |
| | | On = Disable hot spare boot |
| 2 | Interlock enable | Off = Interlock enabled |
| | | On = Interlock disabled |
| 3 | System chassis ID | Off = ProLiant DL580 server chassis |
| 4 | System chassis ID | On = ProLiant DL580 server chassis |

LED Indicators

This section contains information on service LED indicators located on the ProLiant DL580 server. LED indicators covered in this section include:

- Front Bezel LED Indicators
- Interlock Status LED Indicators
- Internal Diagnostics Display (IDD) Indicator
- Hot-Plug Power Supply LED Indicators
- Hot-Plug Fan LED Indicators
- PCI Hot Plug Switchboard LED Indicators
- Hot-Plug Hard Drive LED Indicators
- Diskette Drive and CD-ROM LED Indicators

Front Bezel LED Indicators

Figure 4-9 shows the front bezel LED indicators for the ProLiant DL580 server. Table 4-9 identifies the corresponding LED status descriptions.

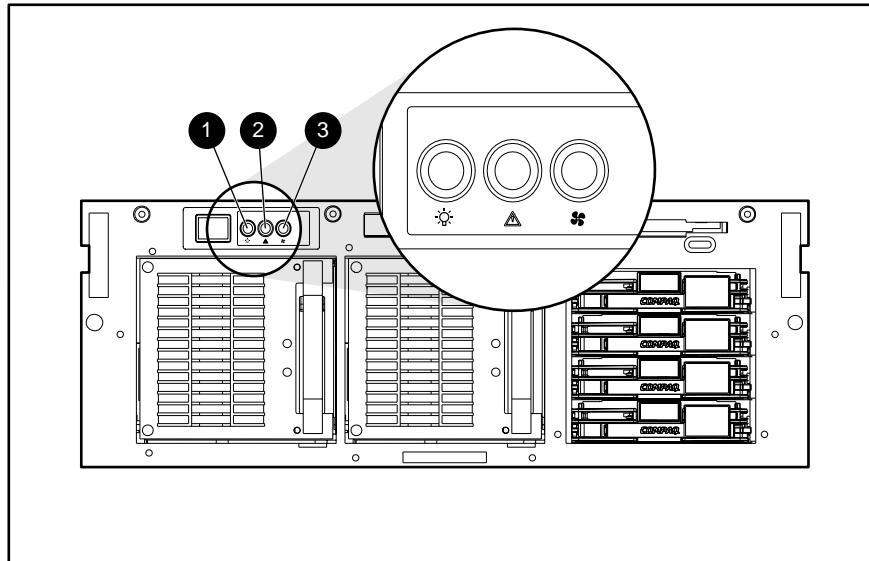


Figure 4-9. Front bezel LED indicators

Table 4-9
Front Bezel Status LED Indicators

| Item | Description | Status | Condition |
|------|-------------|------------------|---|
| ❶ | Power LED | Green | System power on |
| | | Amber | System power in standby |
| | | Amber (flashing) | Temporary shutdown (15 seconds) due to thermal event or an interlock problem |
| | | Off | System power off |
| ❷ | Memory | Green | All memory modules (DIMMs) and processors operational |
| | | Amber (flashing) | One or more DIMMs or processors have failed—check the Internal Diagnostics Display (IDD). See “Internal Diagnostics Display (IDD) indicator” later in this section. |
| ❸ | Fans | Green | All fans operational |
| | | Amber (flashing) | One or more fans have failed—check fan LED indicators. See “Hot-Plug Fan LED Indicator” later in this section. |

Interlock Status LED Indicators

Improperly seated components in the interlock chain cause the LED associated with the fault origination point to illuminate on the system board. Figure 4-10 shows the location of the interlock status LED indicators and Table 4-10 identifies the point of the hardware connection fault.

IMPORTANT: This server is not equipped with chassis door or access panel interlocks.

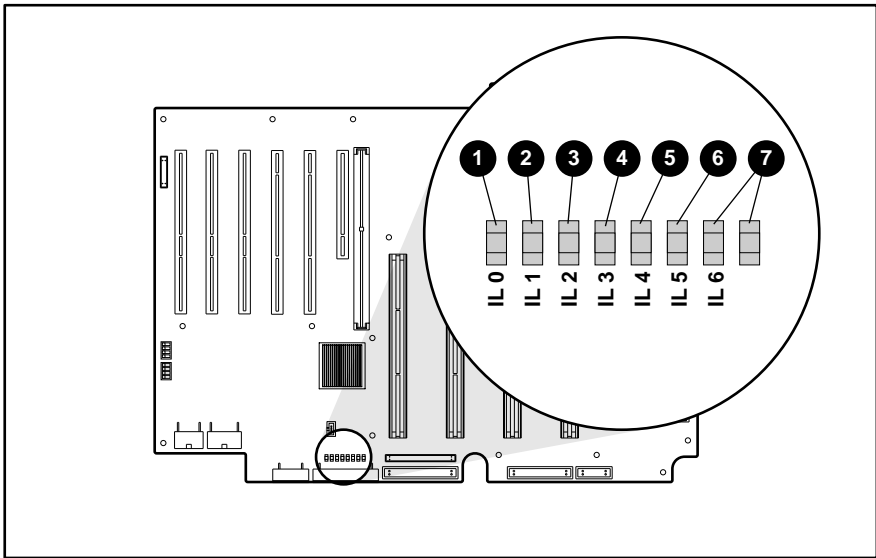


Figure 4-10. Interlock status LED indicators on system board

Table 4-10
System Board Interlock Status LED Indicators

| Fault of Interlock Error | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--------------------------|-----|-----|-----|-----|-----|-----|-----|
| Memory board | On | On | On | On | On | On | On |
| Processor 1 | Off | On | On | On | On | On | On |
| Processor 2 | Off | Off | On | On | On | On | On |
| Processor 3 | Off | Off | Off | On | On | On | On |
| Processor 4 | Off | Off | Off | Off | On | On | On |
| Peripheral board | Off | Off | Off | Off | Off | On | On |
| P/S backplane board | Off | Off | Off | Off | Off | Off | On |
| No interlock error | Off | Off | Off | Off | Off | Off | Off |

Note: Only the left LED indicator in any row provides a valid indication of error. After ensuring that the server is powered down and the power cables are disconnected from all the power supplies, reseal the device associated with the left LED.

Internal Diagnostics Display Indicator

Figure 4-11 shows the location of the Internal Diagnostic Display (IDD) indicator. The IDD indicator provides alphanumeric codes that assist the technician in determining trouble conditions. Table 4-11 lists diagnostic codes that identify processor or memory trouble conditions. Refer to the *Compaq ProLiant DL580 Server Setup and Installation Guide* for more information.

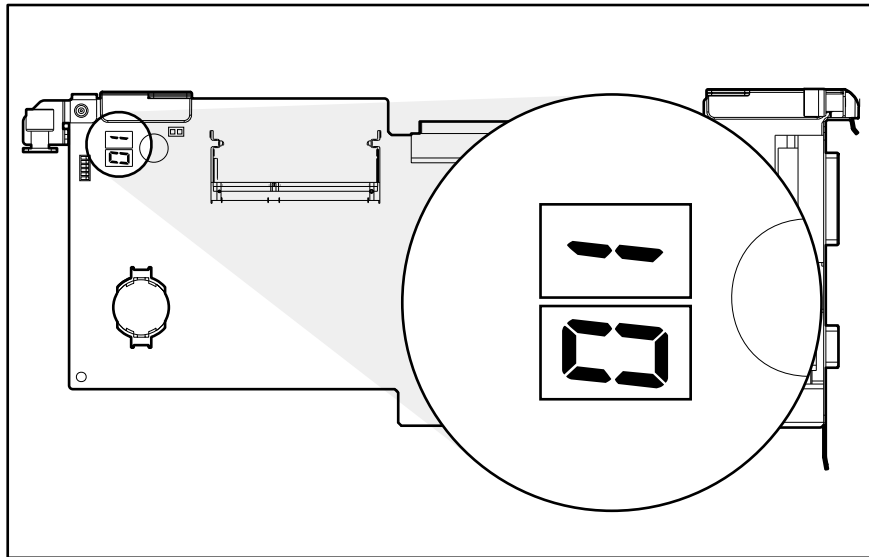


Figure 4-11. Internal Diagnostics Display (IDD) indicator

Table 4-11
Internal Diagnostic Display (IDD) Indicator Codes

| Error Code | Description | Error Code | Description |
|------------|-------------|------------|-------------|
| P1 | Processor 1 | 07 | DIMM 7 |
| P2 | Processor 2 | 08 | DIMM 8 |
| P3 | Processor 3 | 09 | DIMM 9 |
| P4 | Processor 4 | 10 | DIMM 10 |
| 01 | DIMM 1 | 11 | DIMM 11 |
| 02 | DIMM 2 | 12 | DIMM 12 |
| 03 | DIMM 3 | 13 | DIMM 13 |
| 04 | DIMM 4 | 14 | DIMM 14 |
| 05 | DIMM 5 | 15 | DIMM 15 |
| 06 | DIMM 6 | 16 | DIMM 16 |

Hot-Plug Power Supply LED Indicators

Figure 4-12 shows the hot-plug power supply LED indicators on the ProLiant DL580 server. The ProLiant DL580 server ships with two hot-plug, dual-rated, 450-watt power supplies installed. Each hot-plug power supply has a status and an AC power indicator that shows the current status of the power supply. Table 4-12 lists the corresponding LED status descriptions.

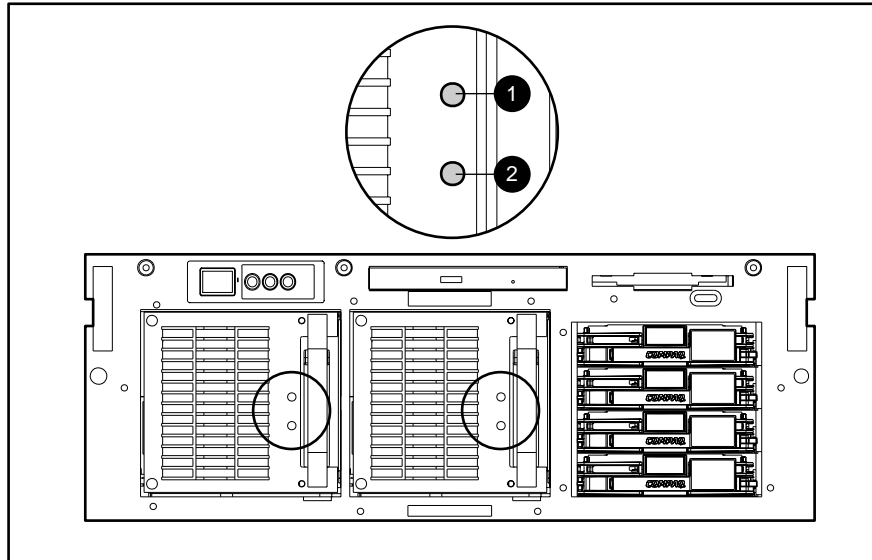


Figure 4-12. Hot-plug power supply LED indicators

Table 4-12
Hot-Plug Power Supply LED Indicators

| Item | Function | LED Status | Current Condition |
|------|----------|----------------|-------------------------------|
| ❶ | Status | Green (steady) | Power OK |
| | | Off | Fault |
| ❷ | AC power | Green (steady) | AC power present |
| | | Off | AC power not present or fault |

Hot-Plug Fan LED Indicators

Hot-plug fan diagnostic LED indicators show the condition of each fan for the ProLiant DL580 server. If the front bezel fan LED indicator is flashing amber, check the individual fan diagnostic LED indicator to determine which fan has failed. See “Front Bezel LED Indicators” earlier in this chapter.

To view the individual hot-plug fan diagnostic LED indicators, remove the access panel of the server. See “Access Panel” in Chapter 2. Figure 4-13 shows the location of the hot-plug fan diagnostic LED indicators. Table 4-13 identifies the diagnostic LED indicators and describes the condition of the fan.

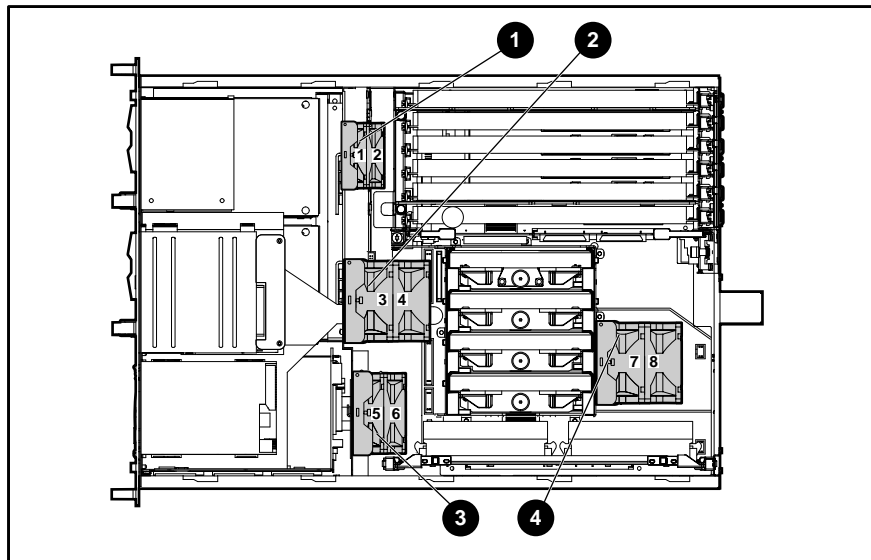


Figure 4-13. Hot-plug fan locations and LED indicators

Table 4-13
Hot-Plug Fan Locations and LED Indicators

| Item | Fan ID | Size | LED Status (All Fans) | Condition (All Fans) |
|------|---------|--------------------------------|-----------------------|----------------------|
| ① | 1 and 2 | 80 x 20 mm (3.15 x 0.79 inch) | Green | Fan is operational |
| ② | 3 and 4 | 92 x 38.1 mm (3.62 x 1 ½ inch) | | |
| ③ | 5 and 6 | 92 x 25.4 mm (3.62 x 1 inch) | Amber | Fan failure—replace |
| ④ | 7 and 8 | 92 x 38.1 mm (3.62 x 1 ½ inch) | Off | No power to fan |

PCI Hot Plug Switchboard LED Indicators

Figure 4-14 shows the LED indicators on the PCI Hot Plug switchboard. They provide information about the status of any given hot-plug board. Table 4-14 identifies the power status, slot status, and LED condition of any hot-plug board and corresponding LED indicator status descriptions.

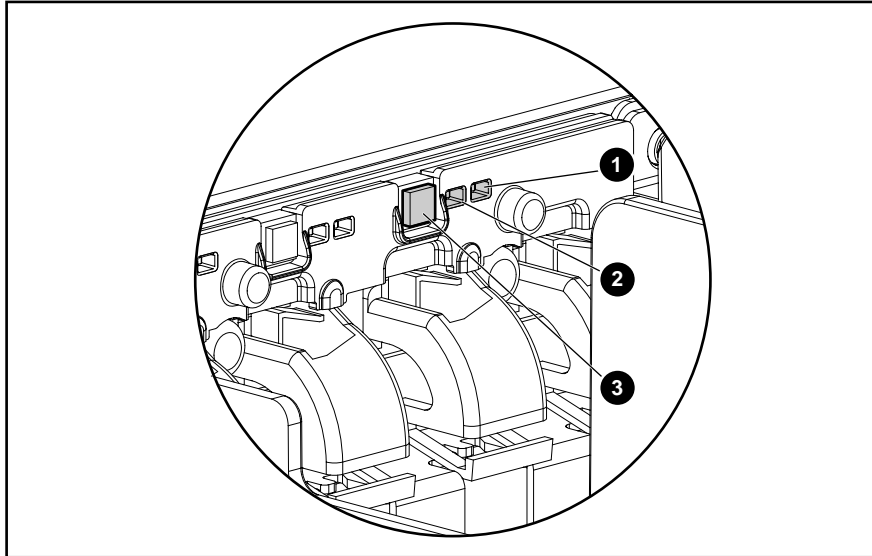


Figure 4-14. PCI Hot Plug switchboard LED indicators, PCI Hot Plug button LED indicators (❶ and ❷), and button (❸) under the PCI Hot Plug access door

The PCI Hot Plug switchboard LED indicators at each expansion slot provide a visual status of the switchboard slots that are hot-pluggable. The LED indicators are viewed from the rear of the server or by opening the PCI Hot Plug access door on the top access panel.

Table 4-14
PCI Hot Plug LED Indicators

| LED Condition | Power Status | OK to Open | Slot Status |
|---------------|--------------|------------|---|
| ① Green | On | No | Power is currently applied to the slot. Do NOT open the slot release lever. The slot is functioning normally. |
| ② Amber | Off | | |
| ① Green | On | No | Power is currently applied to this slot but the slot needs ATTENTION for possible problem with the slot, board, or the driver. Do NOT open the slot release lever. Follow these steps: |
| ② Amber | On | | |
| | | | <ol style="list-style-type: none"> Through the PCI Hot Plug application, turn power off to the slot (the green LED turns off). Open the slot release lever (the amber LED turns off). Remove or replace the board. Connect the cables to the PCI board. Close the slot release lever. Return power to the slot through the PCI Hot Plug application (the green LED turns on). |
| ① Green | Flashing | No | Power slot is being turned off or on, which may take several minutes. There may be a problem with the slot, the PCI board, or the driver. Do NOT open the slot release lever until the green LED is completely off. |
| ② Amber | On | | |
| ① Green | Off | No | Power to this slot is turned off but this slot needs ATTENTION. There may be a problem with the slot, board, or the driver. |
| ② Amber | On | | |
| | | | <ol style="list-style-type: none"> Open the slot release lever (the amber LED turns off.) Remove or replace the board. Connect the cables to the PCI board. Close the slot release lever. Return power to the slot through the PCI Hot Plug application (the green LED turns on.) |
| ① Green | Off | Yes | The power to the slot is off. If you need to replace the board in this slot, follow these steps: |
| ② Amber | Off | | |
| | | | <ol style="list-style-type: none"> Open the slot release lever. Remove or replace the board. Connect the cables to the PCI board. Close the slot release lever. Return power to the slot through the PCI Hot Plug application (the green LED turns on.) |

Hot-Plug Hard Drive LED Indicators

Figure 4-15 shows the location of the hot-plug hard drive LED indicators. Figure 4-16 shows the corresponding LED indicator replacement conditions.

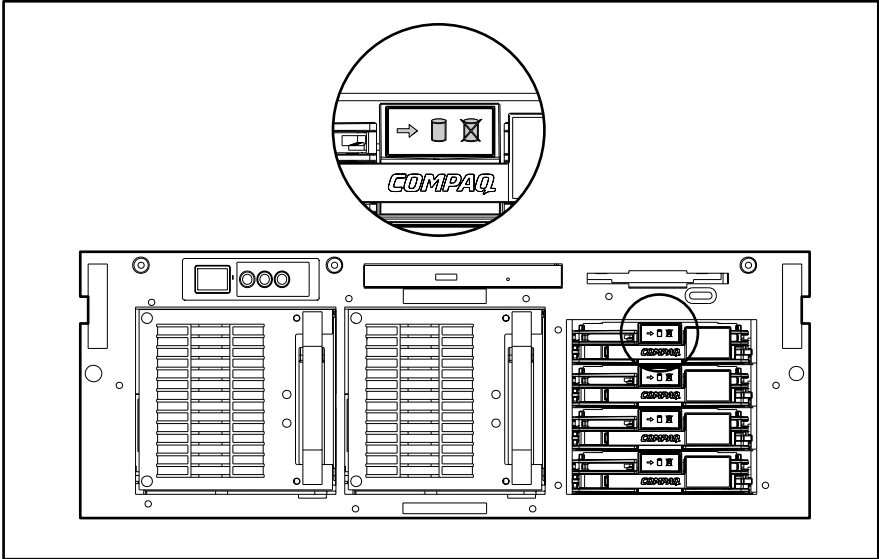


Figure 4-15. Hot-plug hard drive LED indicators

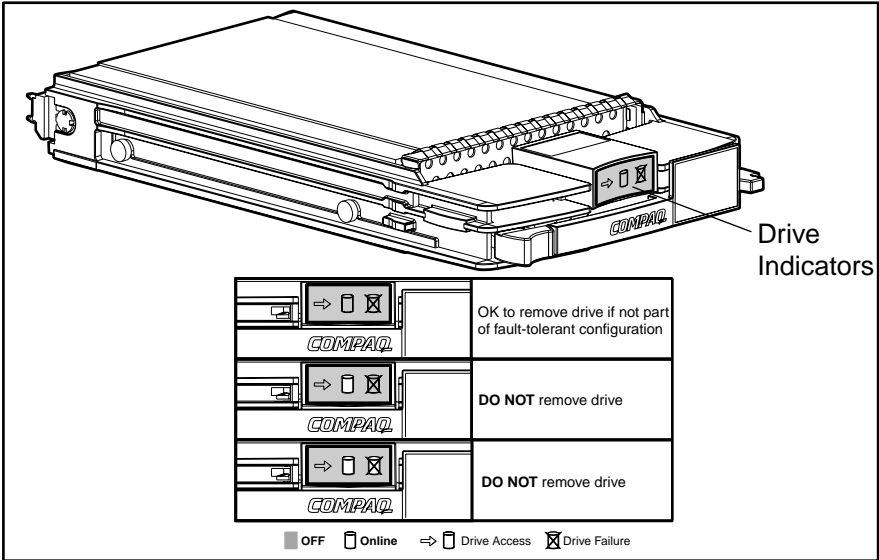


Figure 4-16. Hot-plug hard drive LED indicators replacement conditions

Diskette Drive and CD-ROM LED Indicators

Figure 4-17 shows the location of the diskette drive and CD-ROM LED indicators for the ProLiant DL580 server. Table 4-15 identifies the LED indicators and their function.

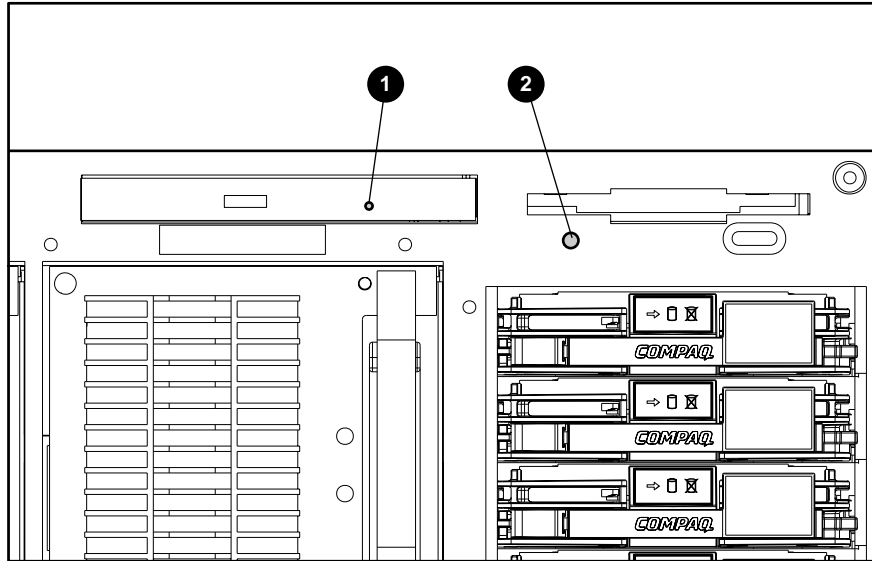


Figure 4-17. Diskette drive and CD-ROM LED indicators

Table 4-15
Diskette Drive and CD-ROM LED Indicators

| Item | Function |
|------|---|
| ① | Indicates read status of the CD-ROM drive |
| ② | Indicates read status of the diskette drive |

Physical and Operating Specifications

This chapter provides operating and performance specifications for the ProLiant DL580 server. The components described in this chapter are as follows:

- System Unit
- Hot-Plug Hard Drives
- Hot-Plug Power Supply
- Memory
- 1.44-MB Diskette Drive
- 24X Low-Profile CD-ROM Drive
- NC3134 Fast Ethernet NIC 64 PCI Dual Base 10/100 Controller
- Integrated Smart Array Controller
- Smart Array 4200 Controller

System Unit

Table 5-1
System Unit Specifications

| Item | Description |
|---|--------------------------------------|
| Dimensions | |
| Height | 17.6 cm (6.94 inch) |
| Width | 48.3 cm (19 inch) |
| Depth | 71.9 cm (28.3 inch) |
| Weight (no hard drive installed) | 30 kg (66 lb) |
| Input requirements (low range to high range) | |
| Rated input voltage | 200 to 240 V (90 to 120 V) |
| Rated input frequency | 50 to 60 Hz |
| Rated input current | 7 A (90 V), 5 A (120 V), 3 A (210 V) |
| Power supply output power (per power supply) | |
| Rated steady-state power | 450 W/450 W (lowline/highline) |
| Maximum peak power | 480 W/480 W (lowline/highline) |
| BTU/hr/power supply | 2291 BTU/hr |
| Temperature range | |
| Operating | 10° to 35°C (50° to 95°F) |
| Nonoperating | -30° to 60°C (-20° to 140°F) |
| Relative humidity (noncondensing) | |
| Operating | 20% to 80% |
| Nonoperating | 5% to 90% |
| Maximum wet bulb temperature | 38.7°C (101.7°F) |

Hot-Plug Power Supply

Table 5-3
Hot-Plug Power Supply Specifications

| Item | Description |
|--|--|
| Input voltage specifications | |
| Nominal line voltage | 200 to 240 VAC (100 to 120 VAC) |
| Range input line | 180 to 270 VAC (90 to 132 VAC) |
| Frequency range | 47 to 63 Hz |
| Power factor | 0.95 |
| Input current | 3.8 A max at 200 V (7.6 A max at 100 V) |
| Inrush current | <150 A at 132 VAC (cold start) |
| Holdup time | 20 ms from zero crossing at 240 VAC 20 ms from zero crossing at 120 VAC |
| General specifications | |
| Full output rating | To 40°C and 465 m (To 104°F and 5,000 ft) |
| | To 32°C and 929 m (derate linearly) |
| | To 90°F and 10,000 ft (derate linearly) |
| Minimum load | 1.0 A on + 5 V output |
| | 1.0 A on + 2 V output |
| | 0.5 A on + 3.3 V output |
| Ambient temperature range | |
| Operating | 10° to 40°C (50° to 104°F) |
| Storage | -40° to 65°C (-40° to 149°F) |
| Dielectric voltage withstand | |
| Input to output | 3000 VAC/min |
| Input to ground | 1500 VAC/min |
| Input transient susceptibility | |
| Common and differential mode (superimposed on AC line) | 2,500 V, 1 μs, damped sinusoid 600 V, 10 μs pulse 20% step change in AC input voltage |

Memory

Table 5-4
SDRAM DIMM Specifications

| | |
|---|---|
| Size | 128-, 256-, 512-MB, and 1-GB |
| Speed | CL-2, CL-3 |
| Upgrade requirement | Bank of four identical DIMMs installed or removed at a time |
| Note: Use only 128-, 256-, 512-MB, or 1-GB registered, 72-bit wide, 3.3-volt, ECC SDRAM. SDRAM must be 100-MHz or faster. Use Compaq SDRAM only. | |

1.44-MB Diskette Drive

Table 5-5
1.44-MB Diskette Drive Specifications

| Item | Description |
|---|--------------------|
| Size | 8.89 mm (3.5 inch) |
| LED indicators (front panel) | Green |
| Read/write capacity per diskette (high/low density) | 1.44 MB/720 KB |
| Drives supported | 1 |
| Drive height | One-third |
| Drive rotation | 300 rpm |
| Transfer rate bits/sec (high/low) | 500 K/250 KBps |
| Bytes/sector | 512 |
| Sectors/track (high/low) | 18/9 |
| Tracks/side (high/low) | 80/80 |
| Access times | |
| Track-to-track (high/low) | 3/6 ms |
| Average (high/low) | 169/94 ms |
| Settling time | 15 ms |
| Latency average | 100 ms |
| Cylinders (high/low) | 80/80 |
| Read/write heads | 2 |

24X Low-Profile CD-ROM Drive

Table 5-6
24X Low-Profile CD-ROM Drive Specifications

| Item | Description | |
|------------------------|---|---------------------|
| Applicable disk | CD-ROM (Mode 1 and 2) | |
| | CD-DA, CD-XA (Mode 2, Form 1 and 2) | |
| | 640-MB (mode 2, 12 cm) | |
| | Photo CD (single- and multiple-session) | |
| Capacity | Mixed Mode (audio and data combined) | |
| | 550-MB (Mode 1, 12 cm) | |
| Block size | 640-MB (Mode 2, 12 cm) | |
| | 2,048 bytes (Mode 1) | |
| | 2,340, 2,336 bytes (Mode 2) | |
| | 2,352 bytes (CD-DA) | |
| Dimensions | 2,328 bytes (CD-XA) | |
| | Height | 4.29 cm (1.69 inch) |
| | Width | 15 cm (5.75 inch) |
| | Depth | 20.8 cm (8.19 inch) |
| Weight | 1.2 kg (2.66 lb) | |
| Data transfer rate | | |
| Sustained | 1,200 KBps | |
| Burst | 8.3 MBps | |
| Access times (typical) | | |
| Full stroke | 200 ms | |
| Random | 100 ms | |

continued

Table 5-6
24X Low-Profile CD-ROM Drive Specifications *continued*

| Item | Description |
|------------------------------|-----------------------------------|
| Disc | |
| Diameter | 12 cm, 8 cm (4.7 inch, 3.15 inch) |
| Rotational speed | 4,200 rpm |
| Center hole (diameter) | 15 mm (0.6 inch) |
| Thickness | 1.2 mm (0.05 inch) |
| Track pitch | 1.6 μ m |
| Interface | IDE (ATAPI) |
| Audio output level, line out | 0.7 VRMs at 47 k Ω |
| Cache buffer | 128-KB |
| Startup time | < 7 seconds |
| Stop time | < 4 seconds |
| Laser parameters | |
| Type | Semiconductor laser GaAlAs |
| Wave length | 780 nm +/- 25 nm |
| Divergence angle | 53.5 degrees +/- 1.5 degrees |
| Output power | 0.14 mW |
| Operating conditions | |
| Temperature | 5° to 45°C (41° to 113°F) |
| Humidity | 10% to 80% |

NC3134 Fast Ethernet NIC 64 PCI Dual Base 10/100 Controller

Table 5-7
NC3134 Fast Ethernet NIC 64 PCI Dual Base 10/100 Controller
Specifications

| Item | Description |
|---------------------------|--|
| Network interface type | Dual port 10/100 Base-TX base |
| Capability | Both ports IEEE 802.3/802.3u 10 Base-T and 100 Base-TX compliant |
| Data transfer method | 32-bit/64-bit bus-master PCI |
| Network transfer rate | Full- or half-duplex capable at 10 Mbps or 100 Mbps on both ports |
| Connector | Dual RJ-45 |
| I/O address and interrupt | Automatic configuration |
| Cable support | |
| 10 Base-TX | Categories 3, 4, or 5 UTP (2 or 4 pair); up to 100 meters (328 feet) |
| 100 Base-TX | Category 5 UTP (2 pair) |
| OS driver support | Novell NetWare DOS Client for unattended installation, Novell NetWare Server v 3.x, 4.x, and 5.x; Microsoft (MS) DOS Client for unattended installation, MS Windows 2000, MS Windows NT 4.0; OS/2 Warp Server; SCO Open Server 5.x, and UnixWare 7.x |

Integrated Smart Array Controller

Table 5-8
Integrated Smart Array Controller Specifications

| Item | Description |
|--|--|
| Maximum drives supported | Up to 6 Wide Ultra2/Ultra3 SCSI hard drives (internal) |
| Logical drives supported | 32 |
| Simultaneous drive transfer channels | 2 |
| Data transfer method | 32-bit PCI bus-master |
| Total transfer rate | 160 MBps (80 MBps per channel) |
| SCSI electrical interface | Low-voltage differential (LVD) |
| PCI bus transfer rate (maximum) | 133 MBps |
| SCSI termination | Active termination |
| SCSI port connectors (internal and external) | PCI 64D extended SCSI connector |
| Protocol | Wide Ultra2 SCSI |
| Software upgradable firmware | Yes |
| Read cache | 8-MB read cache (ECC protected) |

Smart Array 4200 Controller

Table 5-9
Smart Array 4200 Controller Specifications

| Item | Description |
|---|---------------------------------|
| Dimensions | |
| Height | 13.7 cm (5.4 inch) |
| Length | 12.4 cm (31.5 inch) |
| Thickness (including array accelerator) | 2.5 cm (1.0 inch) |
| Temperature range | |
| Operating | 10° to 35° (50° to 95°F) |
| Nonoperating | -30° to 60°C (-22° to 140°F) |
| Relative humidity (noncondensing) | |
| Operating | 5% to 90% |
| Nonoperating | 5% to 90% |
| Power required | |
| | +3.3V/300 mA |
| | +5V/3.0 A |
| | +12V/60 mA |
| | -12V/0 mA |
| Heat dissipated (maximum) | 16.7 W |
| Maximum drives supported | 18 |
| Logical drives supported | 32 |
| Simultaneous drive transfer channels | 2 |
| Data transfer method | 32-bit PCI bus-master |
| Total transfer rate | 160 MBps (80-MBps per channel) |
| SCSI electric interface | Low-voltage differential (LVD) |
| PCI bus transfer rate (maximum) | 133 MBps |
| SCSI port connectors | PCI 64D extended SCSI connector |

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